

PY G 345 / 4. 17/8
No. 189

Progress Report 189

1976

OIL AND GAS DEVELOPMENTS IN PENNSYLVANIA IN 1975

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES

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PENNSYLVANIA GEOLOGICAL SURVEY

FOURTH SERIES

HARRISBURG

1976

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by

William S. Lytle, Robert G. Piotrowski and Louis Heyman

ABSTRACT

Drilling for oil increased 3 percent in 1975 over that of 1974 while gas well drilling increased 36 percent. As reported last year, the new drilling depth record is 21,460 feet which was established by the No. 1 Leonard Svetz well in Somerset County in Upper Cambrian. The record of the well is published in Table 13. Seismic activity was down from 123 crew-weeks in 1974 to 50 crew-weeks in 1975 in 18 counties, with most of the activity being Vibroseis, costing operators about \$1,000,000. Oil production and reserves decreased and gas production and reserves increased from 1974. The price of new and stripper crude oil in the Bradford District advanced from \$11.85 per barrel January 1, 1975 to \$13.07 at the year's end. By the end of 1975, most purchasers of gas were paying at least 80 cents per Mcf for new intrastate gas with some paying up to \$2.00 per Mcf.

The total number of highlight wells increased from 70 in 1974 to 119 in 1975. The most active gas area was again in Indiana County with 374 new gas wells, up 55 from 1974. Warren, Venango and McKean Counties were the most active oil areas with 272, 175 and 146 wells drilled respectively.

Pennsylvania Grade crude oil production decreased 6 percent to 3,132,000 barrels, while production of Corning Grade crude increased 16 percent to 67,000 barrels. Shallow gas production increased 4 percent to 72,620 MMcf, and deep gas decreased 7 percent to 12,152 MMcf. Gas storage capacity increased to 755,497 MMcf, and stored gas reserves increased 2 percent to 596,324 MMcf.

Other well completions, including service, gas storage, and old well workovers, decreased 4 percent in 1975. The total of all wells reported in 1975 was up by 179 wells, or 12 percent greater than the 1974 total.

Of the 1,399 primary wells reported, 112 were exploratory and 1,287 were development. This is an 11 percent increase in exploratory wells and a 16 percent increase in development wells from 1974. Exploratory completions were 51 percent successful and development completions 99 percent successful.

Exploratory footage was up 8 percent and development footage was up 31 percent from that of 1974. The average depth of all wells was 2,363 feet, 224 feet more than in 1974.

A joint Maraflood operation between the Penn Grade Crude Oil Association and ERDA will soon commence in the tight Bradford sandstone in the Bradford field, McKean County.

INTRODUCTION

Progress Report 178, *Representative Gamma-ray Logs from Shallow and Deep Wells, Western Pennsylvania*, should be referred to for stratigraphic information. Contained in this publication are three shallow gamma-ray logs (two from the oil belt and one from the gas fields) and one deep gamma-ray log on which shallow and deep producing intervals have been designated.

Part I of this report contains comments on wells in the commonwealth with good completions or of special note for other reasons. Part II contains the statistics and review of industry activities for the year. Part III is on the recent Onondaga "reef" discovery and play in McKean County and part IV is the summarized records of the 1975 deep wells.

ACKNOWLEDGEMENTS

Appreciation is hereby extended to the Oil and Gas Division of the Bureau of Land Protection and Reclamation, Pennsylvania Department of Environmental Resources, for the cooperation of that Division in sharing the drillers' logs which are submitted to them by the operators under the oil and gas law.

We also acknowledge with appreciation the cooperation of the Pennsylvania Grade Crude Oil Association; the Pennsylvania Oil, Gas, and Minerals Association; the Pennsylvania Game Commission; the American Gas Association; the American Petroleum Institute; Petroleum Information; the Pennsylvania Department of Environmental Resources' Bureau of Forestry, Division of Minerals.

Appreciation is extended to all operators and companies who released natural gas production statistics and other data.

PART I. COMPLETION HIGHLIGHTS FOR 1975

SHALLOW HIGHLIGHTS

The lower limits of initial production used in considering a shallow well (Upper Devonian or younger) as a highlight well were established at 50 bopd or more and/or over 2 MMcfgpd.

There were 119 shallow highlight wells reported in 1975. A number of operators fail to report a well's initial production to the regulatory agency. Therefore, there are probably several highlight wells that do not appear in the above figure. The shallow highlight wells composed 9 percent of the total exploratory and development wells reported (Table 5). Table 1 gives highlight well statistics.

Figure 1 shows the distribution of the highlight wells. The following is a brief description of those highlight occurrences about which information was released through the Oil and Gas Division of the Bureau of Land Protection and Reclamation.

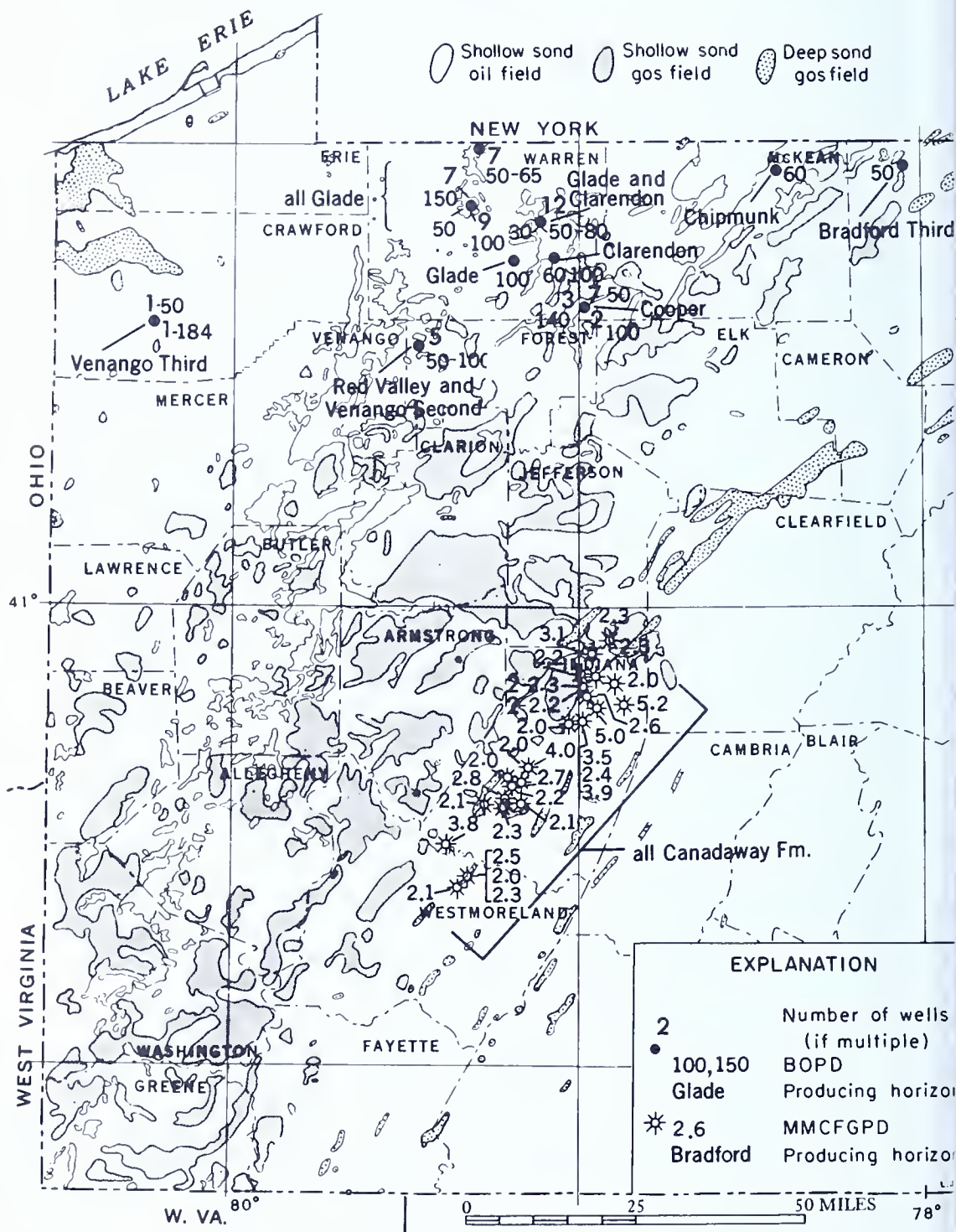
Pre-Speechley Gas Development

The pre-Speechley (Upper Devonian Zone B) development gas play in the west-central part of the state increased considerably over that in 1974 with 548 gas wells drilled in a five-county area in 1975 compared with 396 drilled in the same area in 1974. The number drilled increased in each of the five counties with 38 in Armstrong County in 1975 compared with 13 in 1974, in Clearfield 20 to 18, Indiana 374 to 319, in Jefferson 58 to 19, and in Westmoreland 58 to 27. There were 30 gas highlight wells completed in this zone compared to 14 in 1974. Wells were completed with potentials in MMcf/gpd as follows: Indiana County in the Arcadia field 5.2; Cochvale 2.0; Coleman Hill 4.0; Crete 2.1, 2.3, 2.8, 3.9; East Run 5.0; Lewisville 3.8; Marion Centre 2.0, 2.4, 2.6, 3.5, 3.9; McKee Run 2.0; Richmond-Big Run 3 wells with 2.2, 3 with 2.3 and 1 with 3.1; Tannery 2.1; Warner Hill with 2.0 and 2.2; Jefferson County in the Richmond-

Table 1. *Shallow and Deep Highlight Well Statistics*

	1975			1974		
Fields and Pools with highlight wells	25			21		
Counties with highlight wells	8			6		
Producing Zones	W e l l s			W e l l s		
	Gas	Oil	Total	Gas	Oil	Total
Oriskany	0	0	0	0	0	0
Pre-Speechley in Zone B*	30	14	44	14	16	30
Speechley or younger in Zone B*	0	66	66	0	39	39
Zone D*	0	9	9	0	1	1
Totals	30	89	119	14	56	70

* Zone of Upper Devonian rocks established in Progress Report 178



Big Run field with 2.3; Westmoreland County in the Blairsville field with 2.5 and in the New Alexandria field 2.0, 2.1 and 2.3.

Fourteen highlight oil wells were reported producing from this zone as follows, with potentials in bopd: McKean County-Windfall field 60; Potter County-Crystal 50; Warren County-Cooper 7 wells at 50, 2 at 100, 1 at 135 and 2 at 140.

Glade Sandstone Oil Development

There are 66 crude oil highlight wells that are located in Warren County and produce from the Glade and associated sands. Below are shown the fields and pools in which the wells are located and their initial productions in bopd: Chandlers Valley pool 50; Clarendon field 6 with 50 and 1 with 60; Elkhorn Run 1 with 100; Morrison Run 6 with 50 to 80, 32 with 100; Sugar Grove 5 with 60; and Youngsville 1 with 50, 9 with 100 and 6 with 150.

Other Highlights

Two Zone D wells were productive in the Vernon field in Crawford County at 184 bopd and 59 bopd. Other productive wells in this zone were completed in Forest County in the Asbury Chapel field with potentials of 55, 60, 85 and 101 bopd and a 50 barrel well in the White Church field. There were no deep (Middle Devonian or older) highlight wells during 1975.

PART II. OIL AND GAS INDUSTRY ACTIVITY FOR 1975

BASIS FOR STATISTICS

Local industry statistics herein reported are consistent with figures submitted to national industry organizations. Consequently, drilling and completion data are entirely based on drillers' records and location plats forwarded to the Pennsylvania Geological Survey by the Oil and Gas Division of the Bureau of Land Protection and Reclamation of the Department of Environmental Resources, the administrative and regulatory agency for the oil and gas laws. Only those wells for which records and plats have been received within the year are reported. This includes wells drilled in prior years for which records were submitted and received in 1975. It does not include 1975 wells completed for which records had not been submitted within the year.

Oil production and reserve data were obtained from the American Petroleum Institute and gas production and reserve data were obtained from the American Gas Association.

PREVIOUS COMPILATIONS

The summarized records of deep wells (those which reach rocks of Middle Devonian age or older) are shown in Table 13 and the locations of all exploratory wells are on Figure 4 (centerfold). For those deep wells drilled prior to 1950, the summarized records and other information on the commonwealth's oil and gas activities are to be found in Mineral Resource Report 31 (Pennsylvania Geological Survey). Similar information for the 1950 to 1954 period was published in Mineral Resource Report 39, and for the 1955 to 1959 period in Mineral Resource Report 45. For years 1960 through 1974, this information was published annually in Progress Reports 158, 160, 165, 166, 168, 172, 173, 175, 177, 181, 183, 184, 186, 187, and 188 of the Pennsylvania Geological Survey. Oil and gas developments in the shallow sands (Upper Devonian or younger) are described in Mineral Resource Report 45 and in Progress Reports 135, 139, 143, 144, 147, 150, 151, 154, 155, 157, 158, 160, 165, 166, 168, 172, 173, 175, 177, 181, 183, 184, 186, 187 and 188.

A list of deep-well samples on file with the Survey was published in the Survey's *Catalogue of Deep Well Samples and Geophysical Logs to January 1, 1959* (W. R. Wagner, Inf. Circ. 16). Supplemental lists were published in Progress Reports 157, 158, 160, 165, 166, 168 and 173. These and other deep and shallow well samples, geophysical logs, and other well data are also on file with the Survey. An inventory of all deep and shallow well samples is brought up to date annually. It is available on request at cost of reproduction from the Survey's Pittsburgh office.

INDICATED STATUS OF LOCAL INDUSTRY

Oil well completions, 686 in 1975, increased 3% over the 667 completions in 1974. Pennsylvania Grade crude oil production decreased from 3,341 M bbls. in 1974 to 3,132 M bbls. in 1975 or a 6% decrease, while oil reserves, due to revisions and 1975 production, decreased 5% to 47,377 M bbls. from 49,696 M bbls. in 1974. The price increase for a barrel of new or stripper crude oil made areas economic to operate that were previously considered sub-marginal or marginal. Corning Grade crude oil production increased 16% to 67,000 bbls.

Gas well completions increased from 469 in 1974 to 640 in 1975. Completions of wells classified as oil and gas wells remained the same at 5 in each year. Reserves of gas increased 13% while production increased 3%. The amount of gas in storage increased 2%.

Drilling and Completions

The breakdown of completions by county is shown in Table 2 and the old wells drilled deeper in Table 3.

Table 2. Completions in Pennsylvania, 1975*

TOTAL				GAS			OIL			OIL & GAS			DRY		
County	No. of Wells	Aver. Total Depth (feet)	No. of Wells	Aver. Init. Open-Flow (Mcf/gpd)	Aver. Total Depth (feet)	No. of Wells	Production (Bopd)	Aver. Init. Production (Mcf/gpd)	Aver. Total Depth (feet)	No. of Wells	Open-Flow Production (Mcf/gpd)	Aver. Init. Production (Bopd)	Aver. Total Depth (feet)	No. of Wells	Aver. Total Depth (feet)
Armstrong.....	39	4,175	38	529	4,193	0	0	0	0	0	0	0	0	1	3,466
Beaver.....	3	2,250	2	169	2,898	0	0	0	0	0	0	0	0	1	956
Bedford.....	1	7,203	0	0	0	0	0	0	0	0	0	0	0	1	7,203
Blair.....	1	11,355	0	0	0	0	0	0	0	0	0	0	0	1	11,355
Butler.....	5	1,982	0	0	0	2	2	1,326	1,326	0	0	0	0	3	2,119
Cambria.....	6	3,860	4	626	3,853	0	0	0	0	0	0	0	0	2	3,873
Cameron.....	1	6,925	0	0	0	0	0	0	0	0	0	0	0	1	6,925
Clarion.....	8	2,417	6	157	2,455	1	**	1,179	1,179	0	0	0	0	1	3,425
Clearfield.....	25	3,582	20	660	3,576	0	0	0	0	0	0	0	0	5	3,604
Crawford.....	12	2,592	3	368	3,694	3	14	647	647	2	224	117	749	4	4,145
Elk.....	9	3,514	1	49	2,562	4	**	2,529	2,529	0	0	0	0	4	4,738
Erie.....	11	3,554	7	837	3,419	0	0	0	0	0	0	0	0	4	3,790
Fayette.....	7	4,947	3	244	4,602	0	0	0	0	0	0	0	0	4	5,206
Forest.....	75	1,025	3	154	2,759	70	**	931	931	2	38	1	1,713	0	0
Indiana.....	378	3,666	374	1,009	3,673	0	0	0	0	0	0	0	0	4	3,010
Jefferson.....	60	3,527	58	581	3,528	0	0	0	0	0	0	0	0	2	3,470
Lawrence.....	1	949	0	0	0	0	0	0	0	0	0	0	0	1	949
McKean.....	158	1,871	10	132	2,845	146	**	1,781	1,781	0	0	0	0	2	3,548
Mercer.....	6	1,731	1	990	5,443	3	15	876	876	0	0	0	0	2	1,159
Potter.....	11	1,839	1	29	5,709	10	10	1,452	1,452	0	0	0	0	0	0
Somerset.....	6	9,490	2	1,578	8,790	0	0	0	0	0	0	0	0	4	9,839
Venango.....	179	827	1	350	6,730	175	**	795	795	0	0	0	0	3	706
Warren.....	278	1,191	1	150	4,649	272	40	1,178	1,178	1	100	15	1,130	4	1,248
Washington....	16	4,031	16	384	4,031	0	0	0	0	0	0	0	0	0	0
Westmoreland..	66	3,844	58	885	3,790	0	0	0	0	0	0	0	0	3	4,239
TOTAL	1,362	2,444	609	853	3,707	686	**	1,192	1,192	5	125	50	1,211	62	3,979

*Does not include service wells, miscellaneous wells, gas storage wells, stratigraphic/core tests or old wells drilled deeper.

**Initial productions for majority of wells not given.

Table 3. Old Wells Drilled Deeper in Pennsylvania

T O T A L			G A S			O I L			D R Y		
County	No. of Wells	Aver. Amt. Deepened (feet)	No. of Wells	Aver. Init. Open-Flow (Mcftgpd)	Aver. Amt. Deepened (feet)	No. of Wells	Aver. Init. Production (Bopd)	Aver. Amt. Deepened (feet)	No. of Wells	Aver. Amt. Deepened (feet)	
Armstrong.....	11	664	8	373	781	0	0	0	3	353	
Butler.....	1	160	0	0	0	0	0	0	1	160	
Elk.....	2	185	2	47	185	0	0	0	0	0	
Indiana.....	17	698	15	1,030	778	0	0	0	2	95	
Jefferson.....	2	1,242	2	137	1,242	0	0	0	0	0	
Westmoreland.....	4	777	4	1,197	777	0	0	0	0	0	
TOTAL	37	683	31	761	770	0	0	0	6	235	

Table 4 shows that drilling for oil and gas increased 12% in 1975 over that in 1974 when there was a 10% increase over that of the previous year. During the year exploratory and development drilling increased 11 and 16 percent respectively from 1974, as shown in Table 5.

The total footage in 1975 was up 24% with respect to the amount drilled in 1974 (Table 6).

The 1975 reported discoveries are listed in Table 7 and selected reported exploratory failures are listed in Table 8. The locations of all the exploratory tests are shown in Figure 4. Figure 2 is a graph of the annual rate of shallow activity in the commonwealth from 1950 to 1975, while Figure 3 shows the annual rate of deep exploration and development from 1930 to 1975.

At the end of 1975 a total of 3,330 deep wells had been drilled since the beginning of exploration in the deeper horizons. Of the 3,330 deep wells, 1,777 were gas wells, 141 oil and gas wells, 1,184 dry holes, 222 gas storage wells, 4 for waste disposal, and 2 for testing drilling equipment.

In addition to the 71 dry holes that were drilled in 1975 and plugged and abandoned, there were 1,120 old oil wells and 164 old gas wells that were plugged and abandoned.

Production and Reserves

As shown in Table 9 during 1975, oil production and reserves decreased and gas production and reserves increased from 1974.

The 3,132,000 barrels of Pennsylvania Grade crude had a value of about \$38,397,477 if it is all classified as new or stripper oil. Possibly some of it should be classified as old oil, but these figures are not available. The 67,000 barrels of Corning Grade crude oil was produced from the Medina sandstone (Lower Silurian), mostly in Crawford County. This oil had a value of approximately \$785,240. Development drilling for crude oil was up 3 percent for 1975 from 1974. Former district areas have changed with respect to coverage. Therefore, only average daily oil production figures were available for the bottom curve of Figure 6.

Figure 5 shows the annual production of crude oil in Pennsylvania from 1859 to 1975 and in the Bradford field from 1871 to 1975. The monthly variation in crude oil price, production and well completions is plotted in Figure 6 for the years 1930 to 1975 for the Bradford District (old).

At the end of 1975 there were approximately 17,500 producing gas wells in the commonwealth. The 84,772,000 Mcf of shallow and deep gas shown in Table 9 can be divided into 72,620,000 Mcf of shallow gas and 12,152,000 Mcf of deep gas produced in Pennsylvania during 1975. Figure 7 shows the following for the years 1946 to the present: 1) the yearly production of natural gas; 2) the yearly consumption of natural gas; 3) the natural

Table 4. Drilling and Completions Reported, 1975

Classification		1 9 7 5		1 9 7 4		% Change
SHALLOW	New	Gas Oil Oil & Gas Dry Total	578 686 5 44 1313	414 664 1 41 1119	+ 40 + 3 +400 + 7 + 17	
	Deepened	Gas Oil Dry Total	31 0 6 37	33 3 3 39	- 6 -300 +100 - 5	
DEEP	Sub Total	Gas Oil Oil & Gas Dry Total	609 686 5 50 1350	447 667 1 44 1159	+ 36 + 3 +400 + 14 + 16	
	Deepened & New	Gas Oil & Gas Dry Total	28 0 21** 49	22 4 24* 50	+ 27 -400 + 13 - 2	
PRIMARY SUB TOTAL		Gas Oil Oil & Gas Dry Total	637 686 5 71 1399	469 667 5 68 1209	+ 36 + 3 0 + 4 + 16	
	Misc.	Service (Gas & Water Injection Wells) Gas Storage Old Well Workovers	97 8 133	114 12 123	- 15 - 33 + 8	
TOTAL ALL WELLS			1637	1458	+ 12	

*Includes 1 old well drilled deeper

**Includes 3 dry deep exploratory wells completed as shallow development gas wells

Table 5. Exploratory and Primary Development Reported, 1975*

Type Well	1 9 7 5			1 9 7 4			% Change
EXPLORATORY							
Gas	46	9	2	42	12	0	+ 10
Oil & Gas			55**				- 25
Dry						47	+200
Total (% Successful)							+ 17
							101 (53%) + 11
DEVELOPMENT							
Gas	591	677	3	427	655	5	+ 38
Oil & Gas			16				+ 3
Dry						21	- 40
Total (% Successful)							- 24
							1108 (98%) + 16
TOTALS							
Gas	637	686	5	469	667	5	+ 36
Oil & Gas			71				+ 3
Dry						68	0
Grand Total (% Successful)							+ 4
							1209 (94%) + 16

*Above figures include old wells drilled deeper

**Includes 3 dry deep exploratory wells completed as shallow development gas wells

Table 6. Footage Reported, 1975 and 1974*

No. of Wells	1975 Class	Footage		% Change	Average Ft. Per Well	
		1975	1974		1975	1974
112	Exploratory	438,840	405,423	+ 8	3,918	4,014
1,287	Development	2,914,501	2,224,836	+31	2,265	2,008
97	Service & Strat.	171,180	191,838	-11	1,765	1,683
1,496	<i>SUB TOTAL</i>	3,524,521	2,822,097	+25	2,356	2,133
8	Gas Storage	29,966	33,263	-10	3,746	2,772
1,504	<i>TOTAL</i>	3,554,487	2,855,360	+24	2,363	2,139

* Above figures include old wells drilled deeper

Table 7. Reported Discoveries in Pennsylvania, 1975

Map No.	County	Operator Well No. & Lease	Compl. Date M-Day-Y	Total Depth (Ft.)	Name of Formation at T.D.	Prod. Depth (Ft.)	Prod. Formation (Ft.) or Zone	Initial Daily Prod.	Field or Pool Name	Explor. Class	Remarks
101	Beaver	Thomas F. Jennings 1 Edwin H. Tobias	6/ 1/75	4,930	Lower Helderberg	4,372	Burkett	273 Mcf	Coalbank Run Pool	DPD	Most of production from Murrys-ville at 1,098 feet. New pool discovery Oarlington field.
40		UGI Development Co. 1 Andy Kalemmon	6/21/75	865	Murrys-ville	818	Murrys-ville	100 Mcf	Clarks Run Field	NFO	New field discovery in area of old Murrys-ville oil & gas production.
53	Cambria	Mid-East Oil Co. 1 Martin Bearer	2/ 7/75	3,750	Canadaway Group	3,405	Canadaway Group	650 Mcf	Platts-ville Field	NFD	New field discovery in area of no previous shallow production.

99	Clearfield	Consol. Gas Supply 2 James Mitchell Est.	9/25/75	7,530	Helderberg	7,500	Onondaga Chert	1,032 Mcf	Anderson Creek Pool	NPO	New pool discovery on the Chestnut Ridge anticline.
89	Crawford	Columbia Gas Trans. 1 A. & R. Post	8/20/74	5,146	Queenston	5,061	Medina	726 Mcf	Athens Field	NFD	New field discovery in Medina play of northwestern Pennsylvania.
88		Columbia Gas Trans. 1 Paul Scouten	10/30/75	5,244	Queenston	5,087	Medina	350 Mcf	Eastman Hill Pool	DPD	Deeper pool discovery in Medina play of northwestern Pennsylvania.
1		Moody & Associates 1-A Dwight L. Moody	5/17/75	650	Third Venango	637	Third Venango	184 bbls 398 Mcf	Vernon Field	NFO	New field discovery in area north- west of early large Third Venango oil fields.
85	Erie	Columbia Gas Trans. 1 Morvay	10/30/75	4,032	Queenston	3,976	Medina	350 Mcf	Alder Run Field	NFD	New field discovery in Medina play of northwestern Pennsylvania.
111	Fayette	Amoco Production Co. 1 Francis R. Griffin	3/10/75	8,700	Upper Salina	8,238	Oriskany	500 Mcf	Woodside Pool	DPD	Most of production coming from Canadaway Group of Upper Devonian.
21	Forest	Oillion & Reetz 10 Warrant 3159	12/16/74	2,400	Canadaway Group	2,365	Canadaway Group	55 Mcf	Laurel Run Pool	NPO	New pool discovery in Loleta field.
29	Jefferson	Consol. Gas Supply 1 Samuel L. Crawford	10/ 7/74	3,156	Canadaway Group	2,535	Canadaway Group	179 Mcf	McEwen Run Field	NFD	New field discovery on the north- west flank of the Sabinsville anticline.
93	McKean	Minard Run Oil Co. 2 Minard Run Wt. 2279	1/10/75	10,478	Little Falls	10,230	Little Falls	500 Mcf	Minard Run Pool	DPD	Deeper pool discovery in Bradford field in Upper Cambrian.
107	Somerset	Amoco Production Co. 1 R. J. Lambert	9/22/73	8,740	Oriskany	8,670	Oriskany	1,856 Mcf	Shanksville Field	NFD	New field discovery on Negro Mountain anticline.
92	Warren	Columbia Gas Trans. 1 J. & S. Christensen	10/30/75	4,649	Queenston	4,519	Medina	150 Mcf	Whites Run Field	NFD	New field discovery in Medina play of northwestern Pennsylvania.
69	Westmoreland	Modulus Corp. 1 Modulus Corp Fee Tr.	10/ 7/75	4,109	Canadaway Group	2,564	Canadaway Group	60 Mcf	Hoggs Field	NFD	New field discovery in southern Westmoreland County.
71		Peoples Nat. Gas Co. 1 Alex Kovacs	10/14/74	3,656	Canadaway Group	1,592	Big Injun	158 Mcf	Macbeth Pool	SPD	Shallow pool discovery on the Fayette anticline.

Table 8. Selected Exploratory Failures Reported in Pennsylvania, 1975

Map No.	County	Operator Well No. & Lease	Compl. Date M-Day-Y	Total Depth (Ft.)	Name of Formation at T.D.	Explor. Class or Field	Remarks
102	Armstrong	Peoples Natural Gas Co. 2 Veryl M. Clark	12/14/74	7,331	Helderberg	DPT	Oriskany (Lower Devonian) test on southwestern plunge of Greendale anticline.
112	Bedford	Columbia Gas Trans. Corp. 1 O. W. & A. Clark	8/10/75	7,203	Chaneyville	NFW	Oriskany (Lower Devonian) test in highly folded and faulted Valley and Ridge Province.
103	Blair	Amoco Production Company 1 Blair Gap Water Supply Co.	4/18/75	11,355	McKenzie	NFW	Tested Williamsport (Upper Silurian) sandstone just west of the Allegheny front.
90	Crawford	Columbia Gas Trans. Corp. 1 Eager Beaver Lumber Co.	10/ 6/75	5,339	Queenston	OPT	Silurian test in area of Medina play in northwestern Pennsylvania.
98	Elk	Flint Oil & Gas, Inc. State Game Lands No. 28	8/31/75	6,158	Silurian Salt	DPT	Upper Silurian test on northwest flank of Smethport anticline.
86	Erie	Columbia Gas Trans. Corp. 1 Ronald H. Webb et ux	10/28/75	4,525	Queenston	NFW	Medina (Lower Silurian) test in area of Medina play in northwestern Pennsylvania.
110	Fayette	Amoco Production Company 1 Russell G. Estep	1/27/75	8,949	Helderberg	NFW	Oriskany (Lower Devonian) test on northwest flank of Laurel Hill anticline.
100	Jefferson	Ooverspike Brothers, Inc. 1 Ooverspike Brothers, Inc.	5/ 1/75	7,339	Helderberg	DPT	Oriskany (Lower Devonian) test on Sprinkle Mills anticline.
94	McKean	Pennzoil Company 1 Arthur F. Reeves	11/18/75	4,897	Salina	OPT	Onondaga (Middle Devonian) reef test of seismic prospect.
95	Potter	Columbia Gas Trans. Corp. 1 Hamlin, Hamlin & Forrest	11/ 4/74	5,709	Helderberg	DPT	Oriskany (Lower Devonian) test in area of Oriskany pinchout.
80	Somerset	Amoco Production Company 1 Elwood Oay	5/21/74	5,527	Brallier	DPT	Test of Upper Devonian shales and interbedded sandstones on surface expression of Somerset syncline.
105		Amoco Production Company 1 P. & B. Gerula	4/18/75	9,270	Helderberg	NFW	Oriskany (Lower Devonian) test just west of Allegheny front.
109		Amoco Production Company 1 Leonard Svetz	12/18/74	21,460	Elbrook	NFW	Gatesburg (Upper Cambrian) test on the Laurel Hill anticline. Deepest well in Appalachian Basin.
104	Westmoreland	Peoples Natural Gas Co. 1 Louis Emanuel	12/10/74	8,005	Marcellus	EXT	Beck Pool Oriskany (Lower Devonian) extension on the Laurel Hill anticline.

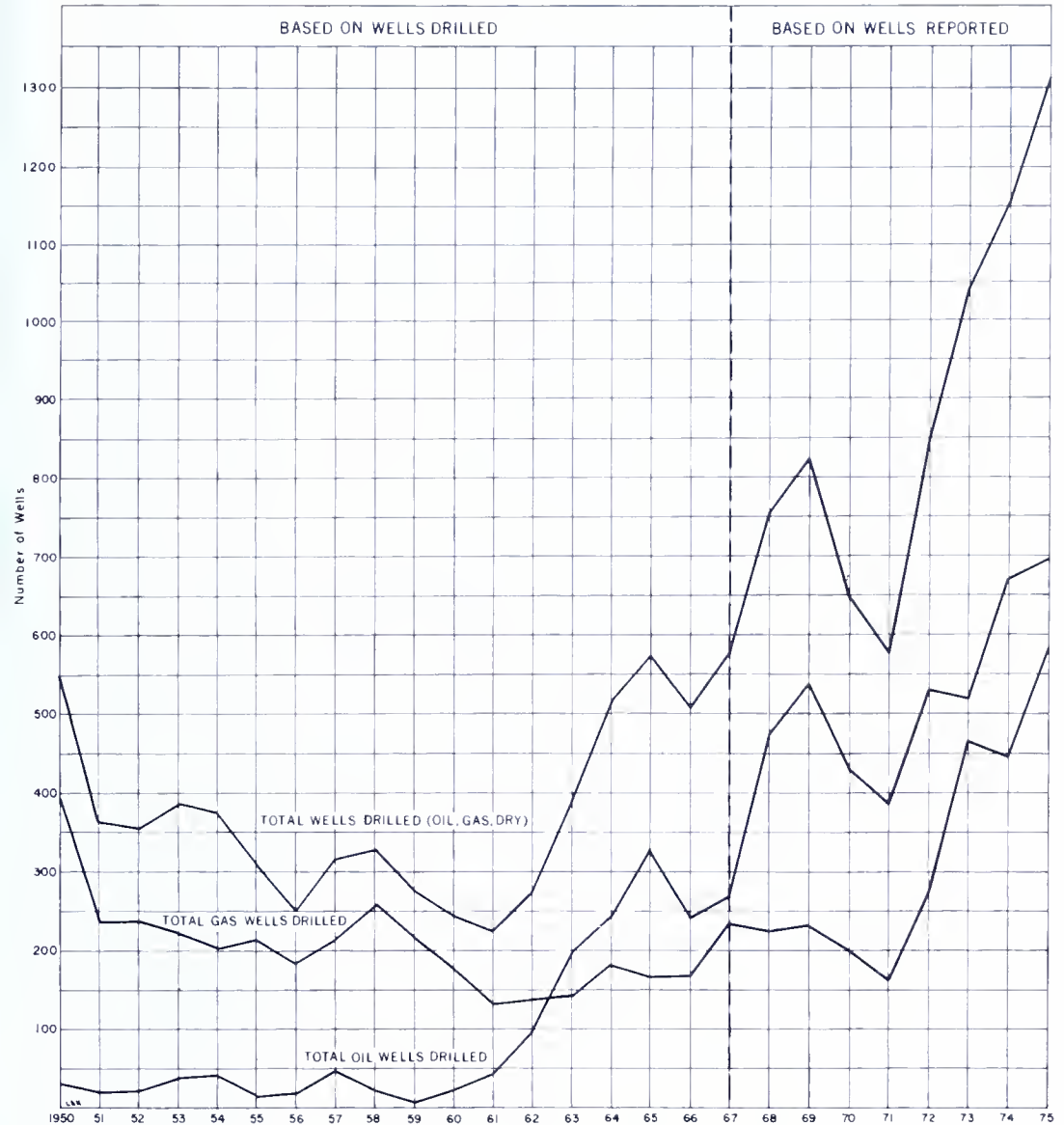


Figure 2. Shallow well activity, 1950-1975.

gas reserves; and 4) the amount of natural gas in storage. The consumption of natural gas in the state continues to decline from its high in 1972 of 829,031,000 Mcf to 715,623,000 Mcf in 1974. The deep gas production by field and pool is shown in Table 11.

Gas Storage Fields

There were 8 wells drilled for gas storage during the year, 3 of which were deep wells and 5 shallow. Several gas storage wells were worked over during the year. Storage well drilling activity was down 33 percent from

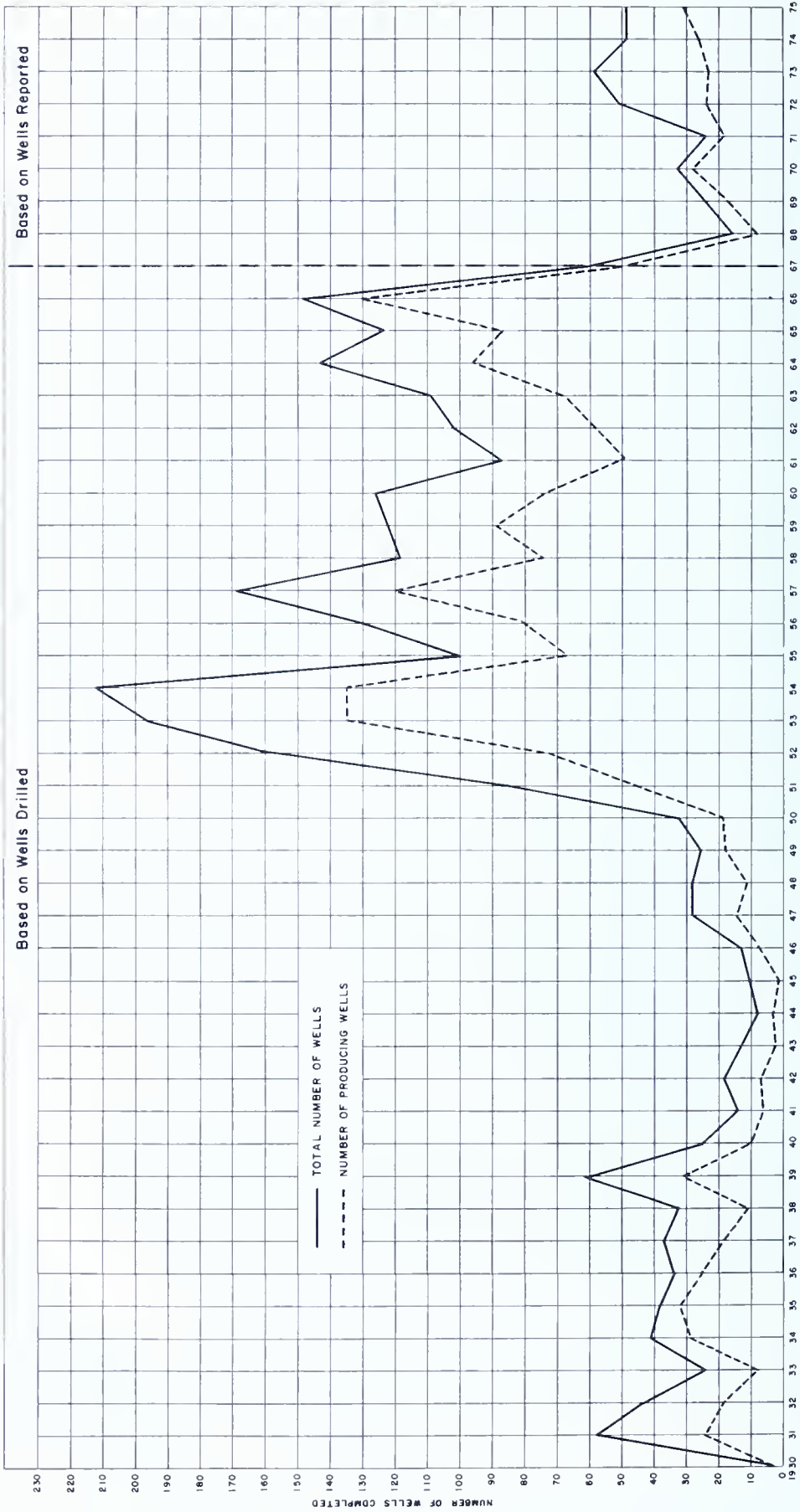


Figure 3. Annual rate of deep sand exploration and development, 1930-1975.

Table 9. Production and Reserves in Pennsylvania, 1975

	Production				Reserves	
	1975	1974	% Change	Cumulative to 12/31/75	1975	1974 Change %
Oil (1,000 bbls.)	Penna. Grade	3,132	3,341	- 6	1,286,057	49,696 - 5
	Corning Grade	67	58	+16	551	718 - 9
	TOTAL OIL	3,199	3,399	- 6	1,286,608	50,414 - 5
Natural Gas Liquids (1,000 bbls.)		65	79	-18	515	580 -11
	Shallow	72,620	69,728	+ 4	---	---
	Deep	12,152	13,007	- 7	---	---
Gas (MMcf)	TOTAL GAS	84,772	82,735	+ 3	1,682,460*	1,492,145* +13
Stored Gas					596,324	585,789 + 2

* Stored Gas Included

Table 10. Average Daily Oil Production

<i>District</i>	<i>1975</i>	<i>1974</i>	<i>% Change</i>
*Bradford District	4,263	5,459	-22
*Middle and Southwestern District	4,317	3,700	+11
Medina (Corning)	184	159	+16
TOTAL	8,764	9,318	- 6

*1975 production on a different area base than 1974.

that of 1974. Figure 8 of Progress Report 186 shows the distribution and lists the names of the current gas storage fields in Pennsylvania. A map of the gas storage fields at a scale of 1:500,000 is available at the Survey's Pittsburgh office at cost of reproduction.

The storage capacity increased during the year to 755,497,000 Mcf compared to 728,110,000 Mcf in 1974. The total stored recoverable gas on December 31, 1975 was 596,324,000 Mcf or 2 percent more than the amount in storage on December 31, 1974. The gas in storage consisted of 28,634,000 Mcf of native gas and 607,713,000 Mcf of stored gas.

Secondary and Tertiary Recovery Projects

There were 97 water or gas injection wells completed during the year, down 15 percent from those completed in 1974. In McKean County 146 oil wells were completed, most of them in secondary recovery projects. The waterfloods in McKean County produced about 50 percent of Pennsylvania's yearly crude oil production.

The McKean County Bradford field Maraflood project continues into its seventh year of operation on an economical basis. The Warren County project at Selkirk has been shut down. A new Maraflood project in tight Bradford sandstone in the Bradford field, McKean County, is about to get under way. This is a joint project between the Penn Grade Crude Oil Association and ERDA.

Oil and Gas Prices

Crude oil prices for the year are shown in Table 12. Gas prices have varied considerably in the commonwealth during the year. By the year's end most purchasers of gas were paying at least 80 cents per Mcf for new intrastate gas with some paying up to \$2.00 per Mcf. A number of companies have adjusted their old contract up to 60 cents or more per Mcf. Interstate gas is 52 cents per Mcf for large producers, those producing over 10,000,000 Mcf gas per year, and up to \$1.40 per Mcf for the small operators (several factors determine the price).

Table 11. Deep-Gas Production in Pennsylvania, 1975

County	Field	Pool	Discovery Date	Cumulative Production at End of 1974 (In Mcf)	Production 1975 (In Mcf)	Cumulative Production at End of 1975 (In Mcf)	Status of Field or Pool at End of 1975	
Armstrong.....	Goehenville* Roaring Run*	Snyderville Roaring Run Oriskany	10/23/70 12/14/70	94,992 2,732,622**	106,503 1,227,228	201,495 3,959,850	Producing Producing	
Bedford.....	Purcell		12/14/57	3,125,808		3,125,808	Gas Storage	
Cambria.....	Patton	Burley Pindleton	1/15/69 6/30/69	94,116 3,317,477	69,924 478,414	164,040 3,795,891	Producing Producing	
Cameron.....	Canoe Run East Emporium		8/24/73 11/18/71	 1,321,000	 792,000	 2,113,000	Shut-In Producing	
Cameron & Elk	Whippoorwill		7/10/61	15,146,000	148,000	15,294,000	Producing	
Cameron, Elk, Jefferson, Clear- field and Indiana.....	Punkstutawney*- Driftwood	TOTAL Anderson Creek Benezette Driftwood Boone Mt. OuBois Sabula Helvetia Reed- Deemer Rockton Sykesville Hicks Run	9/15/51 9/25/75 1/ 5/53 9/15/51 9/18/58 1/ 6/60 8/26/63 5/11/60 5/ 9/55 12/ 1/53 2/25/55 11/10/60 6/ 7/56	481,218,000 246,508,000 103,203,000 883,000 126,447,000 4,177,000	2,312,000 817,000 697,000 16,000 743,000 39,000	483,530,000 247,325,000 103,900,000 899,000 127,190,000 4,216,000	Producing Shut-In Producing Producing Producing Producing Producing	
Clearfield..	West Decatur		3/30/73	244,882	559,932	804,814	Producing	
Clinton & Potter.....	Leidy	TOTAL Ole Bull	1/ 9/50 1/ 9/59	160,189,061 5,389,029	35,000 35,000	160,224,061 5,424,029	Gas Storage & Producing Producing	
Crawford.....	Athens Greenwood Sparta	Eastman Hill	9/20/74 10/30/75	 TOTAL	 33,610,393	 1,445,590	 35,055,983	Shut-In Shut-In
Crawford & Erie.....	Conneaut	TOTAL Bushnell- Lexington Indian Spring Kastle Lundys Lane Pierce West Mead	2/11/57 12/31/58 9/11/57 7/14/62 11/ 9/61 12/31/58 7/ 8/74	14,836,603 12,806,013 3,008,574 1,797,838 785,634	433,331 646,852 128,834 207,713 25,598 3,262	15,269,934 13,452,865 3,137,408 2,005,551 811,232 3,262	Producing & Abandoned Producing Producing Producing Producing Producing	
Elk	Benzinger Horton	Root Jack	11/ 7/72 9/20/73	 3,349	 2,900	 6,249	Shut-In Producing	
Erie.....	Alder Run Bull Reservoir Burgess Corry TOTAL Beaver Dam McKean Meade Northeast	 TOTAL Beaver Dam	10/30/75 9/17/72 10/17/60 4/29/47 5/20/53 1/19/73 8/23/46	154,613 1,057,264 203,564 115,158 4,925,538	4,346 2,811 14,718	158,959 1,060,075 206,375 129,876 4,925,538	Shut-In Shut-In Producing Gas Storage & Producing Producing Producing Oriskany Gas Storage (1 Shut-In Medina Well) Shut-In	
Fayette	Ohioptyle Sandy Creek*	Fike Quebec Run Spruett Summit TOTAL North Summit South Summit	12/28/59 8/ 8/63 8/ 8/63 6/31/69 10/31/61 3/24/38 5/ 9/42	4,103,720 595,462 421,217 174,245 3,897,065 42,992,019 21,186,920 21,777,949	93,803 15,103 7,925 7,178 631,768 261,954 115,442 146,512	4,197,523 610,565 429,142 181,423 4,528,833 43,253,973 21,302,362 21,924,461	Producing Shut-In Shut-In Shut-In Producing Producing & Abandoned Producing Producing	
Indiana.....	Cherry Hill* Jacksonville Nolo Strongstown	Crichton Hadden Pineton	1/ 9/63 7/11/63 9/21/56 9/30/56 12/20/69	2,856,697 28,700,054 13,412,031 754,000	50,889 265,782 140,772 1,014,000	2,907,586 28,965,836 13,552,803 1,768,000	Producing Producing Producing Producing	
Jefferson.....	Big Run*	Elk Run	6/30/65	46,002,000	718,000	46,720,000	Producing	
McKean.....	Bradford Corydon	Cyclone Minard Run	2/18/74 1/10/75 9/ 8/72	45,074 	291,526 	336,600 	Producing Shut-In Shut-In	
Mercer	Henderson Wheatland	Wilgore	10/26/66 7/24/63	 186,617	 14,675	 205,024**	Production not available Producing	
Potter	Ulysses	New Field	10/ 2/39 4/ 2/62	 3,886,832	 84,662	 3,971,494	Producing	
Somerset.....	Boswell	TOTAL Boswell Snyder	11/11/58 11/13/58 6/16/60 9/22/73	11,260,600 10,302,606 957,994	258,394 236,356 22,038	11,518,994 10,538,962 980,032	Producing Producing Producing Shut-In	
Venango.....	Barkeyville Franklin Oak Forest Wesley	Duncan Galloway Irwin	4/ 5/73 11/12/73 12/ 1/72	54,086 12,000 61,570	20,152 14,925 44,564	74,238 26,925 106,134	Producing Producing Producing	
Warren.....	Sugar Grove Whites Run	Pettigrew	5/29/70 10/30/75	 	 	 	Shut-In Shut-In	
Washington.....	Daniels Run*	Glyde	9/ 6/61	109,039	6,110	115,149	Producing	
Westmoreland..	Blairsville* Latrobe* Jacobs Creek* Lycippus TOTAL St. Boniface Chapel Murrysville* Duquesne	Kahl Dry Ridge Bailey TOTAL St. Boniface Chapel	10/23/62 8/25/46 12/26/61 8/17/49 9/13/56 11/ 3/1878 8/ 8/65	9,499,989 5,285,295 1,677,664 6,290,608 5,551,180 611,200 482,273	300,470 91,908 116,127 68,727 68,727 39,151 39,151	9,800,459 5,377,203 1,793,791 6,359,335 5,619,907 650,351 521,424	Producing Producing Producing Producing & Abandoned Producing Producing & Abandoned Producing	
Westmoreland & Somerset.....	Johnstown	TOTAL Baldwin Beck Williams TOTAL Blair Tunnel Seven Springs	5/16/57 5/22/60 5/16/57 2/14/58 12/15/58 12/ 5/58 3/10/65 8/ 3/66	26,298,004 9,335,857 16,962,147 7,261,275 5,934,531 614,321	844,170 409,150 435,020 125,214 97,988 27,226	27,142,174 9,745,007 17,397,167 7,386,489 6,032,519 641,547	Producing & Abandoned Producing & Abandoned Producing Producing & Abandoned Producing Producing	

**Shallow Gas Production of Field Not Shown

**Correction

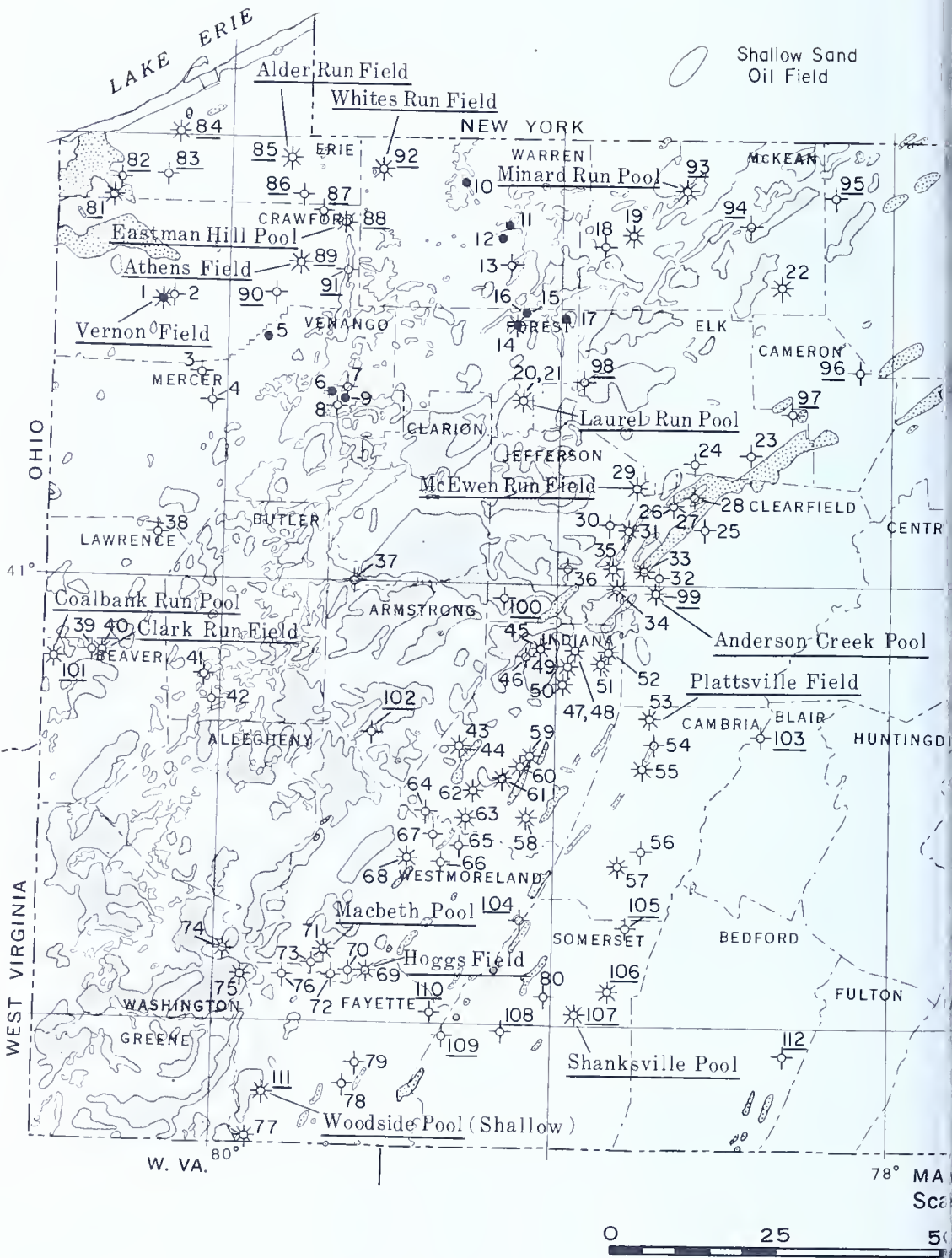
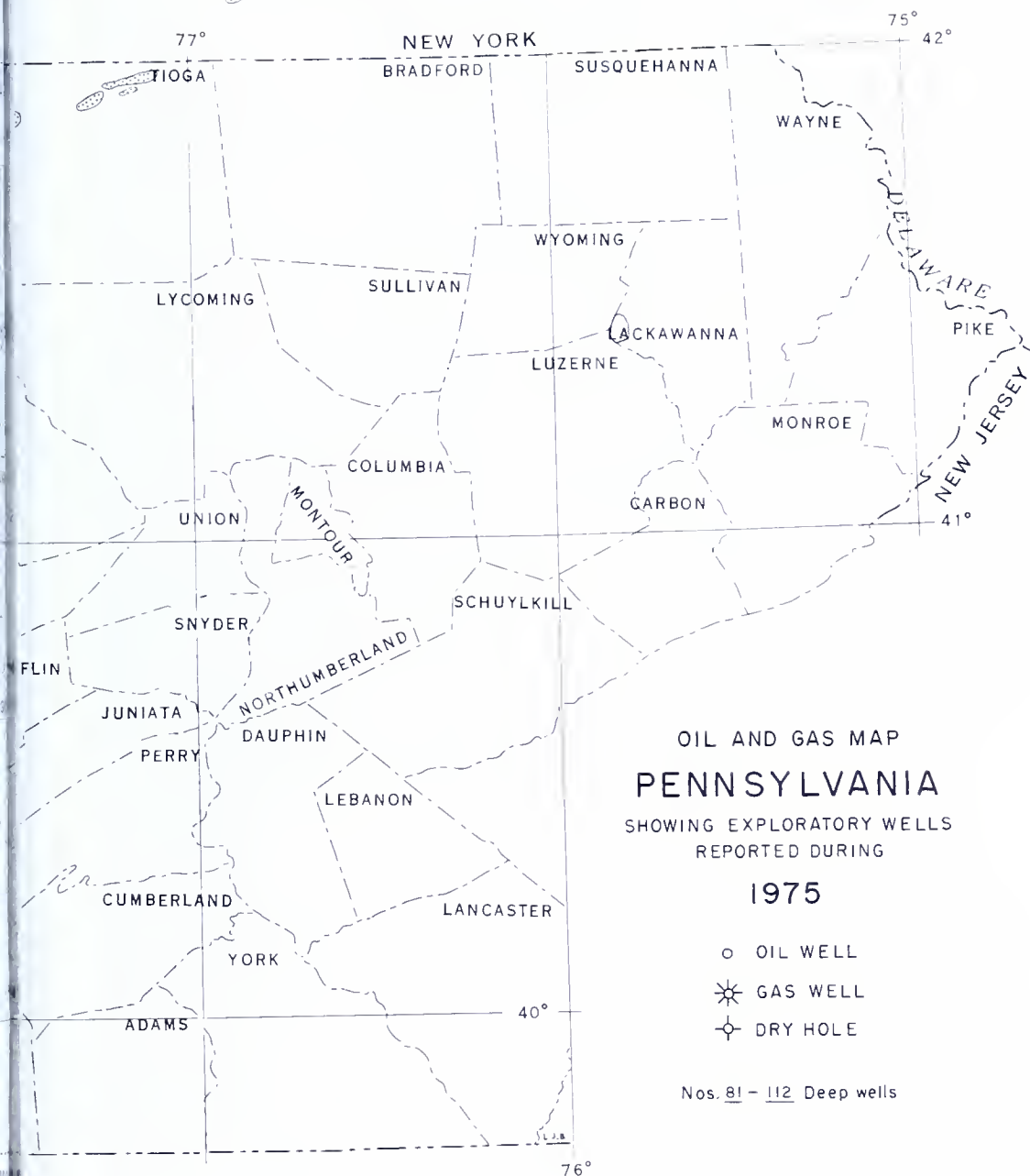


Figure 4. Oil and gas map of Pennsylvania

Shallow Sand
Gas Field

Deep Sand
Gas Field



Showing exploratory wells reported in 1975.

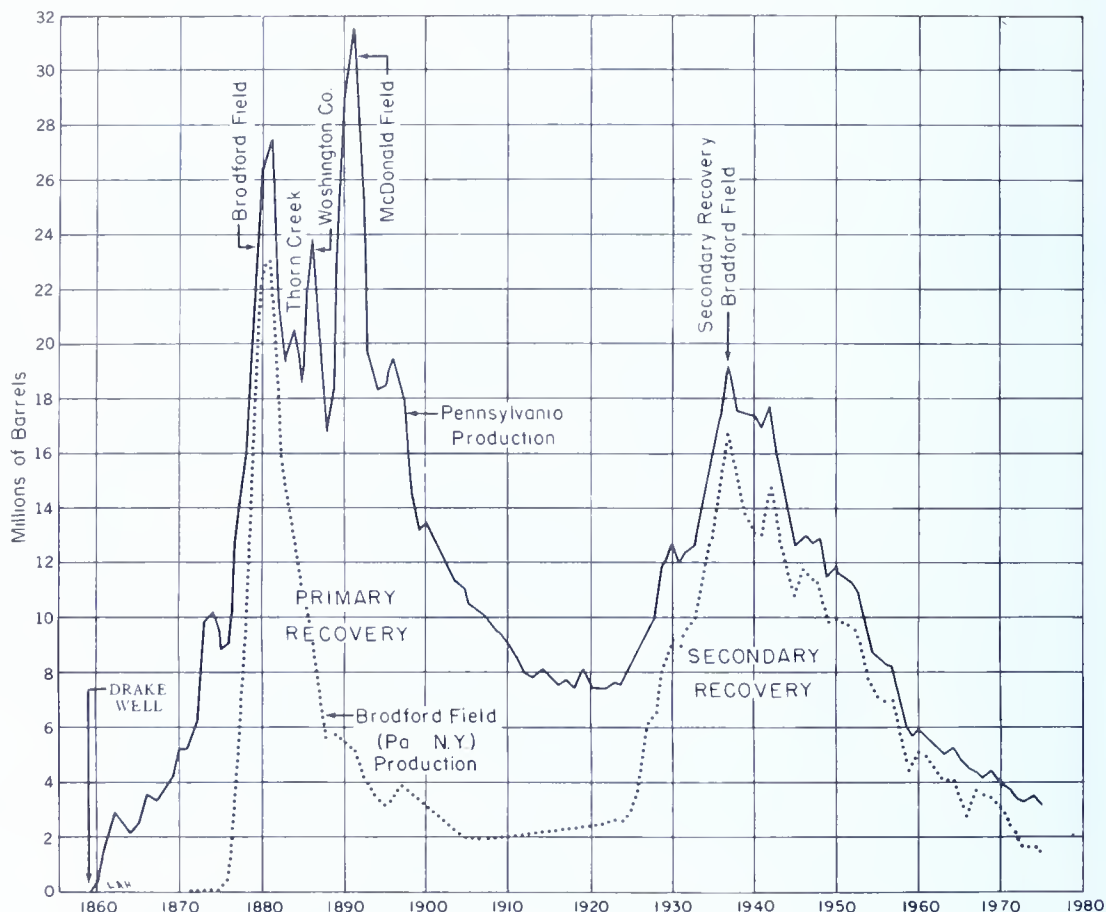


Figure 5. Annual production of crude oil in Pennsylvania.

Land Sales

At the end of 1975 the Pennsylvania Game Commission had 44 active leases totaling 33,880 acres, and 43 wells producing on 12 of these leases. Production from the 43 wells amounted to 391,559 Mcf during the year.

In 1975, three tracts of State Forest or Park lands were leased for the exploration and development of oil and gas. From the leasing of these lands, which are located in Cameron and Potter Counties and total 5,925 acres, the Department received a first year's rental bonus of \$29,810.70. The average bonus per acre received from the competitively bid tracts was \$5.03.

Also during the year, two tracts were obtained by the acquisition of lands for State Forest use which already had oil and gas leases issued upon them. The lands containing the oil and gas leases totaled 803 acres and all carried the standard rental of \$1.00 per acre per year. These lands are located in Lycoming County.

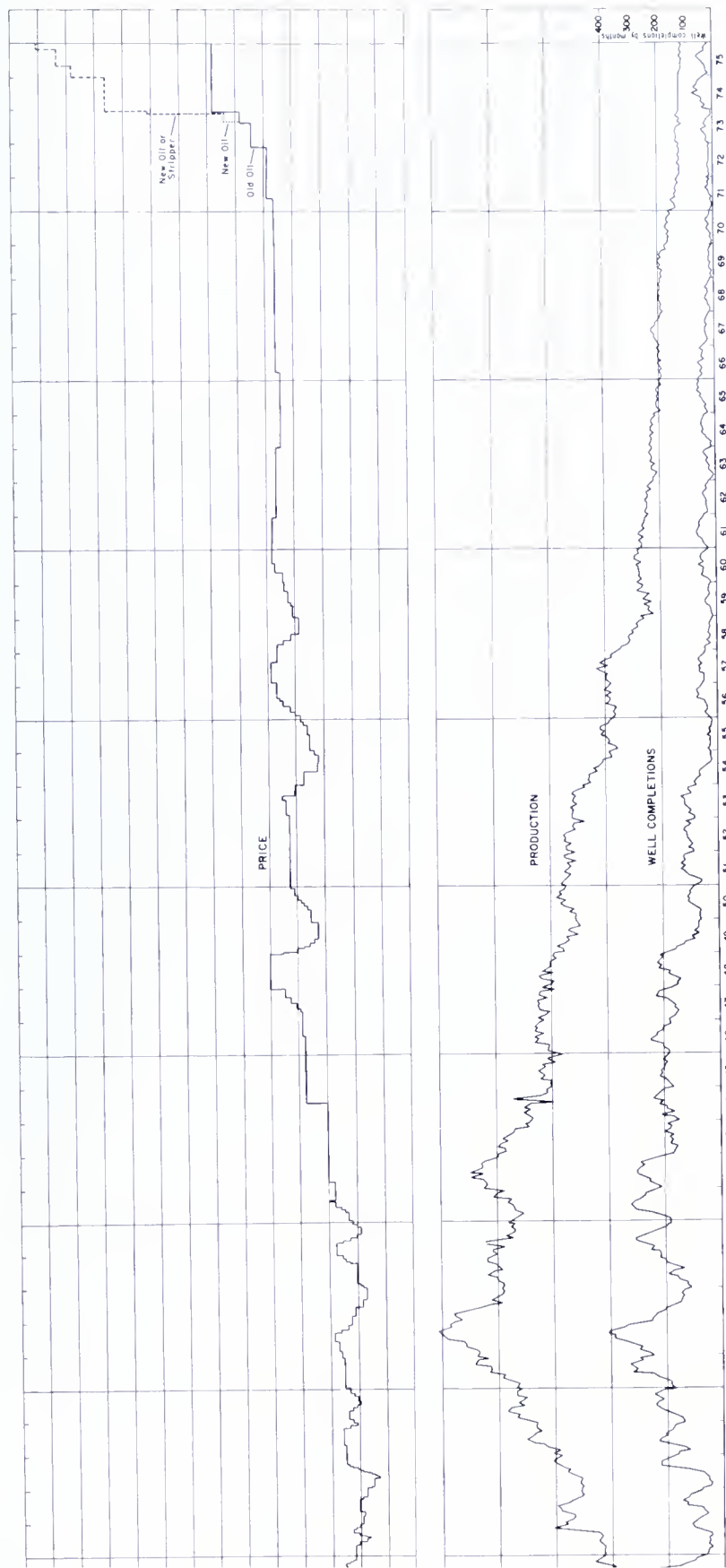


Figure 6. Crude oil prices, production and completions, Bradford District.

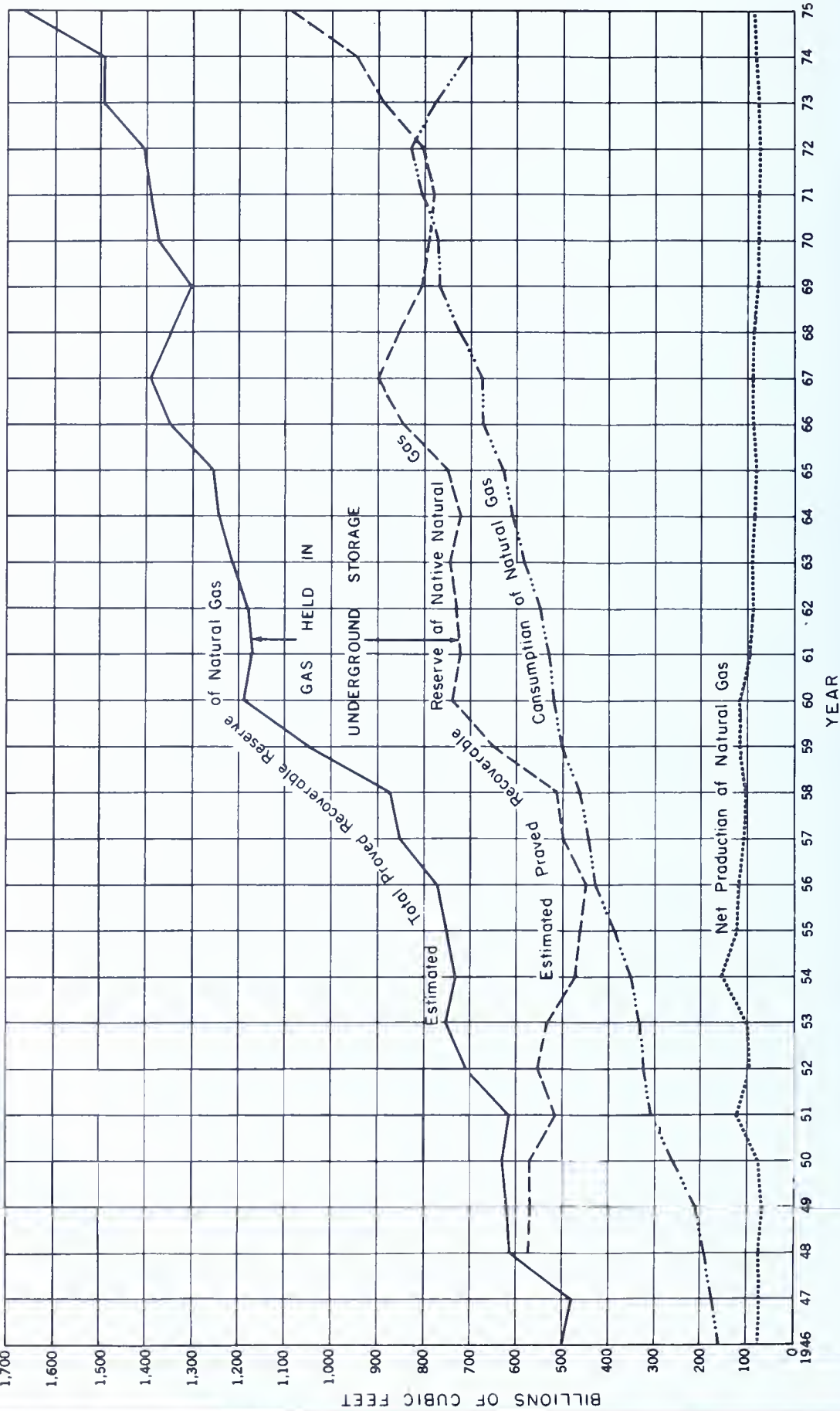


Figure 7. Production, consumption and reserves of natural gas in Pennsylvania.

Table 12. Crude Oil Prices per Barrel, Pennsylvania, 1975

<i>Pennsylvania Grade Crude</i>							
		<i>Old Oil</i>		<i>New or Stripper Oil</i>			
		1/1/75 to 12/31/75	1/1/75	5/1/75	11/1/75		
Bradford District	.....	\$6.83		\$11.85	\$12.37	\$13.07
Middle District	.....	6.55		11.48	12.00	12.70
Southwest District	.....	6.12		11.33	11.85	12.55
<hr/>							
<i>Corning Grade Crude</i>							
		<i>Old Oil</i>		<i>New or Stripper Oil</i>			
		1/1/75 to 12/31/75	1/1/75	4/1/75	6/1/75	7/1/75	11/1/75
Crawford & Erie Cos.		\$5.17	\$10.00	\$11.20	\$11.72	\$12.22	\$12.92
<hr/>							

Rental and royalty payments received during 1975, which were related to the oil and gas development and storage programs, resulted in a total income of \$516,715.39. Of this total, royalty payment for the year amounted to \$76,247.71 for 968,332 Mcf. Rentals for new wildcat acreage and past leasing programs totaled \$151,362.78 while storage rentals were \$275,772.65. Other income for pipelines, compressor stations rentals and seismic survey totaled \$13,332.25.

At the end of the year, 261,049 acres of State Forest and Park lands were under lease for oil and gas exploration and development. This figure includes 98,611 acres in gas storage.

Geophysical Activity

The Department issued two seismic permits to industry to conduct subsurface studies to evaluate the lands for possible oil and gas exploration. These permits are located in Cameron and Fulton Counties.

Seismic activity was down from 123 crew-weeks in 1974 to 50 crew-weeks in 1975 with most of the activity being Vibroseis. The total cost of the seismic work was about \$1,000,000. The seismic surveys were made in Blair, Butler, Cameron, Centre, Clarion, Clearfield, Crawford, Franklin, Fulton, Greene, Huntingdon, Lawrence, McKean, Mercer, Pike, Potter, Tioga, and Venango Counties, 18 of the 67 counties in the commonwealth.

1975 Highlights

Discoveries were up to 16 which is one more than in 1974. Of the 16 discoveries, 15 were gas and 1 oil. What could be a most significant discovery was the #1 Metropolitan Industries (Figure 8, Well B) shale gas well drilled by Quaker State Oil Refining Corporation in Beaver County, discovering the Darlington field. The well was completed in 1975 but the

record was not received until 1976, therefore the record will be published in next year's report. The well was drilled to the Queenston (Upper Ordovician) and was plugged back and fractured in Upper Devonian shale from just above the Onondaga limestone to above the Tully limestone. The initial production from the shale was 150 Mcfgpd at a 48 hr. rock pressure of 1150 psi. Other than early shale gas wells drilled in a 6 mile wide belt, which was discovered in 1860 (Figure 8, Area C-1) along Lake Erie, it is only the third shale gas discovery in the commonwealth. The second discovery was in Washington County in 1961, the #1 Cooper (Figure 8, Well D) which discovered gas in shale correlative with the Bradford Third sandstone. In 1975 a well drilled by Basin Petroleum (Figure 8, Well E) to the southwest of the #1 Cooper also found gas in the same interval. Northeast of the Darlington discovery, the #1 Edwin H. Tobias in Beaver County (Figure 8, Well A and Table 13) found gas in the shale just above the Tully. In addition to the above wells, Figure 8 shows the deep wells that had gas shows in Upper Devonian shales in the 1000 foot interval above the Onondaga limestone.

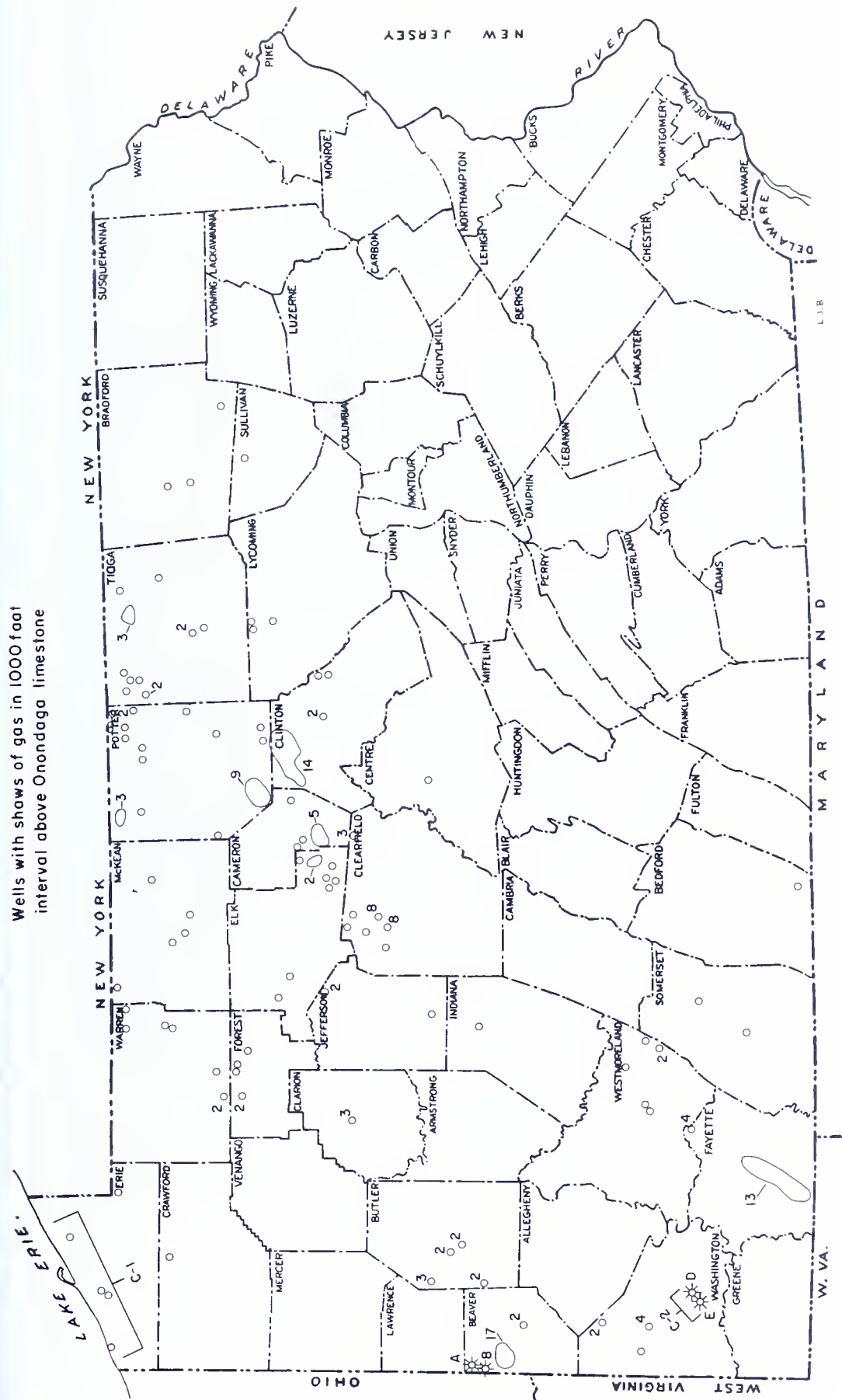
In McKean County, the #2 Minard Run Tract (Figure 4, Table 13) found gas in the Little Falls dolomite (Upper Cambrian), discovering the Minard Run pool. The estimated initial production was 500 Mcfgpd at a 48 hr. rock pressure of 3000 psi. Work is continuing on this well. In Somerset County, the #1 R. J. Lambert found gas in the Oriskany sandstone discovering the Shanksville field (Figure 4, Table 13). The #1 Thomas Benson was completed 9 months later as a confirmation well.

The Vernon oil field was discovered by the #1-A Dwight L. Moody in Crawford County. Initial production of the well was 184 bopd from the Venango Third sandstone. Production is from a small lens of sandstone probably with small reserves.

A seismic reef prospect, #1 Arthur F. Reeves, was drilled in Keating Township, McKean County, but no reef development was found. The #1 Blair Gap Water Supply Co. well in Antis Township, Blair County, was completed as a dry hole to the McKenzie (Middle Silurian) at a total depth of 11,355 feet. The deepest well in the Appalachian Basin, #1 Leonard Svetz (Figure 4, Table 13) by Amoco Production Company was completed as a dry hole in the Elbrook (Upper Cambrian) at a total depth of 21,460 feet.

The major deep activity has been in northwestern Pennsylvania in the Medina play while the Indiana County area has been the most active in shallow drilling. Activity will continue in these two areas in 1976.

Wells with shows of gas in 1000 foot interval above Onondaga limestone



c [Gas production from shales in Conadaway Formation

Figure 8. Shale gas in Pennsylvania.

INDUSTRY RELATED ACTIVITIES

Subsurface Base Maps

Twenty-three base maps (Figure 9) showing locations of oil and gas wells and the outlines of the oil and gas fields are now available. Each base map encompasses four 15-minute topographic quadrangles and is at the same scale (1 inch equals 1 mile). A five-minute grid, quadrangle names, county boundaries, and major rivers and towns make up the background of the base map. All deep wells known and all shallow wells on record with the Pennsylvania Geological Survey are located, and the status (dry, oil producing, gas producing, etc.) is shown by symbol. Deep wells (Tully Formation or deeper) are differentiated and elevation and total depth are shown. Symbols indicate the availability of geophysical log and sample data on open file in the Survey's Oil and Gas Geology Division office in Pittsburgh. An index map with the legend shows the outlines of oil and gas fields within the mapped area, thus indicating

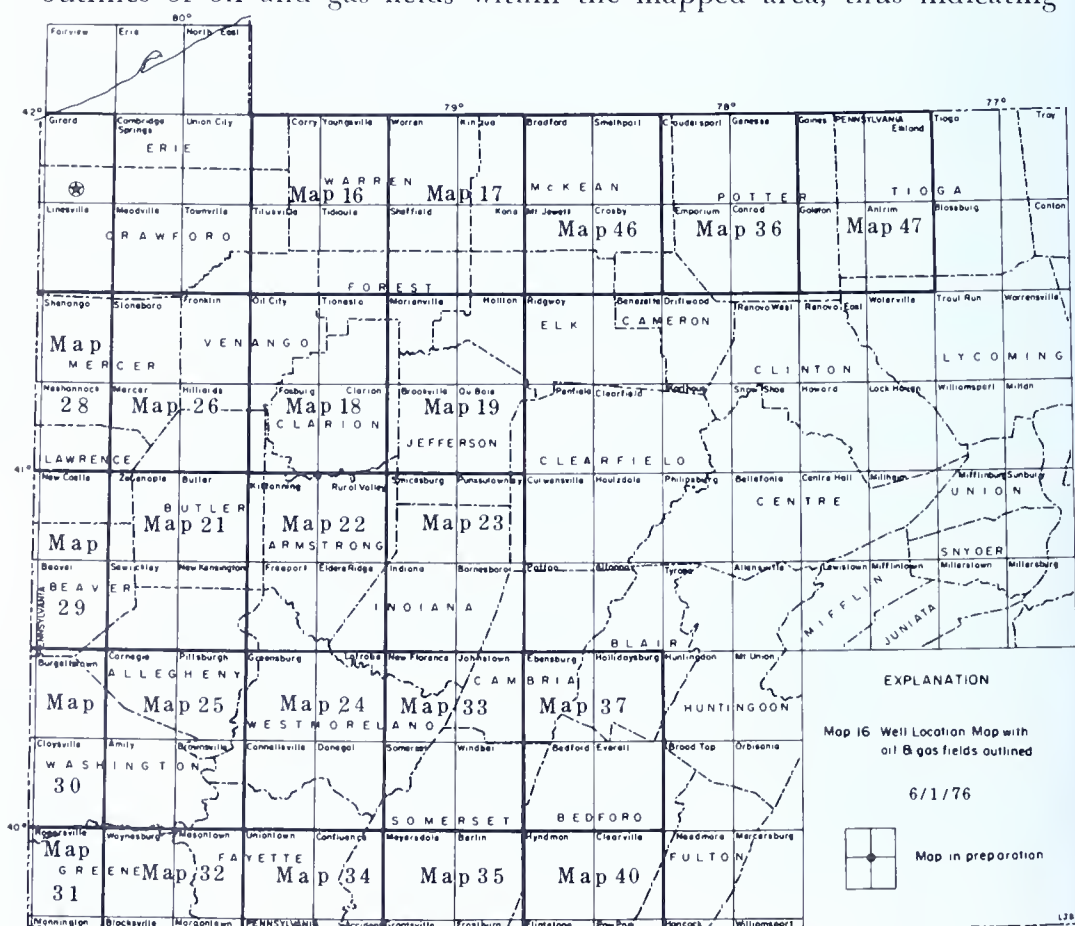


Figure 9. Index of available subsurface base maps.

areas of extensive pre-1956 drilling. A listing of the field names is also included.

Paper prints of the base maps can be obtained by writing to the State Book Store, P. O. Box 1365, Harrisburg, Pennsylvania 17125. The cost of each base map is \$0.50, plus a 6 percent sales tax to Pennsylvania residents. A check for the appropriate total amount made out to the Commonwealth of Pennsylvania must accompany the order. When ordering please specify the map number.

A cross index of state permit numbers with quadrangle map numbers used on the base maps is available from the Pittsburgh Branch of the Pennsylvania Geological Survey, 1201 Kossman Building, Stanwix Street, Pittsburgh, Pennsylvania 15222. This index is arranged by quadrangles. Please specify the quadrangle when requesting this literature. Base maps are updated every year. Maps now available were updated as of June 1, 1976. A list of the Survey's publications and open file reports can be obtained by sending a request to either the Pittsburgh or Harrisburg office.

PART III. OIL AND GAS GEOLOGY DIVISION STUDIES

ONONDAGA "REEFS"—McKEAN COUNTY, PENNSYLVANIA

by Robert G. Piotrowski

In 1967, a subsurface Onondaga "reef" was discovered in Jasper Township, Steuben County, New York. Subsequent exploration efforts have resulted in other "reef" discoveries in the central area of western New York (Mesolella, 1975). "Reef" development apparently occurs where the Onondaga Formation is regionally less than 50 feet thick. The "reefs" are believed to develop on a more stable or slightly uplifted platform lying between subsiding areas. The area of Onondaga thinning was observed to extend into north central Pennsylvania, and "reefs" were predicted to be present along this trend (Wagner in Kelley, et al., 1970).

The first Onondaga "reef" discovery in Pennsylvania was in an area of regionally thin (50 feet) Onondaga as predicted when Amoco Production Company completed the #1 Amoco-Witco well in McKean County (Figure 10). This Middle Devonian "reef" discovery lies at a depth of 5,172 feet below the surface. The "reef" is 181 feet thick and has a total gas column of 106 feet. The initial production from the well was 200,000 cubic feet of gas per day. An 86 foot interval from 5,184 feet to 5,270 feet was treated with a total of 13,000 gallons of 28% HCL and 10,000 gallons of 15% HCL resulting in an initial production after acid treatment of 3,000,000 cubic feet of gas per day (Figure 11).

The Onondaga Formation has been subdivided into four members (Oliver, 1954; Peterson, 1974). These are the Edgecliff member, the

McKEAN CO.

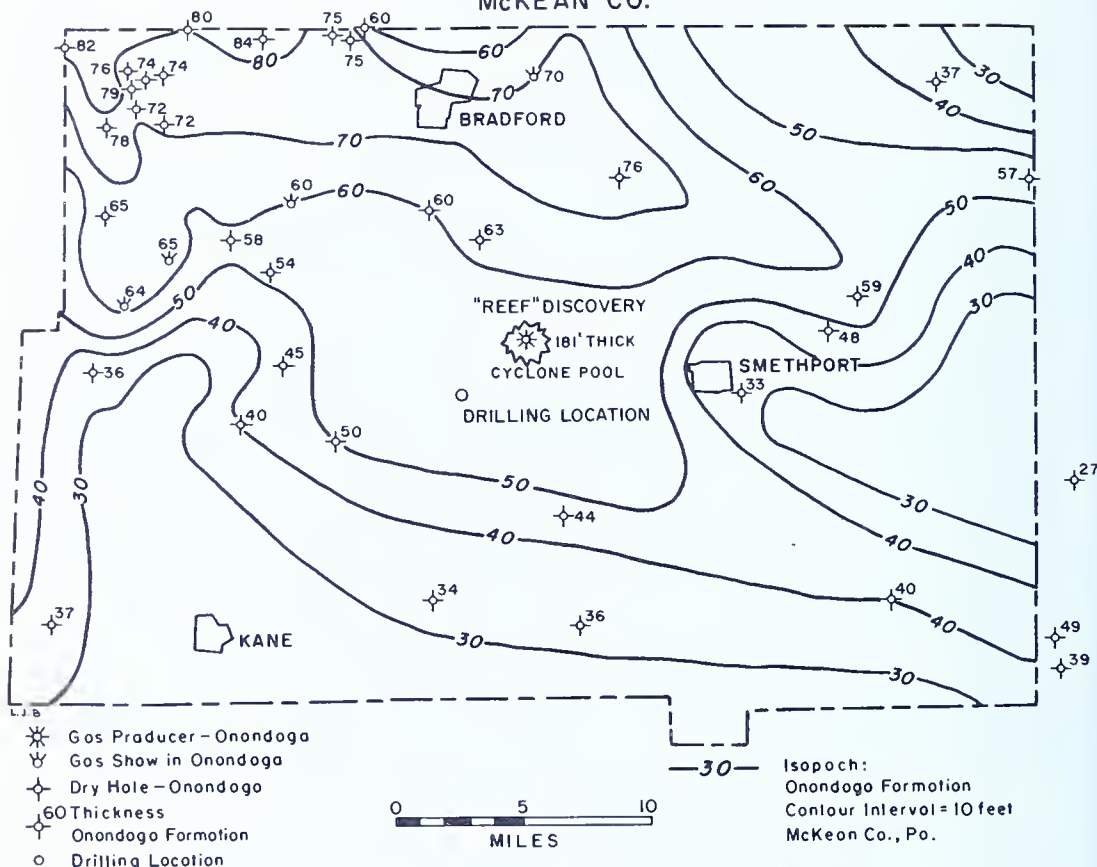


Figure 10. Isopach map of the Onondaga Formation showing the location of the Reef Discovery Well at Cyclone Pool, McKean County, Pennsylvania.

Nedrow or Clarence member, the Moorehouse member, and the Seneca member (Figure 12). The Onondaga is deposited over two different units in McKean County. In the southeast portion of the county, the Bois Blanc Formation, which is here a thin siltstone or shale, underlies the Onondaga. In the northwest portion of the county, a sandstone unit underlies the Onondaga (Figure 13). Both of these units lie unconformably on the rocks below. The sandstone in the northwest portion of the county has been called Oriskany, but the correlation of this sandstone to true Oriskany is not certain. It has been suggested that this could possibly be a sandy facies of the Bois Blanc Formation (Heyman, personal communication). Just southeast of McKean County, Oriskany sandstone is known to exist. Thus, the southeast portion of McKean County is a broad area of non-sand deposition which is flanked on the northwest and southeast by sandstones. This may define a paleo-high which received no sand deposition or from which the sandstones were eroded.

The lowest member of the Onondaga Formation is the Edgecliff member. The Edgecliff is defined on a gamma-ray log by a very low

AMOCO #1 WITCO
BRADFORD I-10
McKEAN CO., PA.

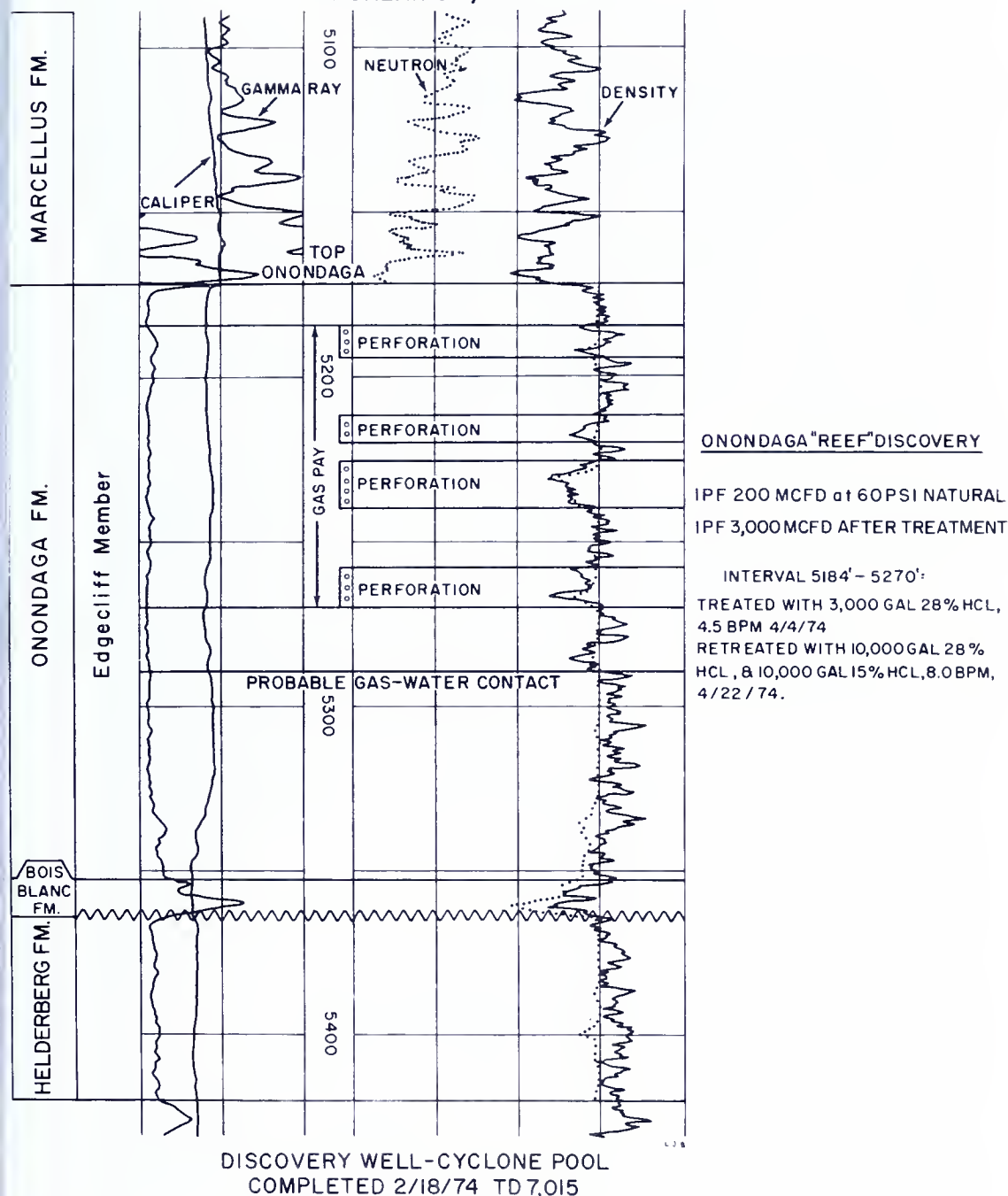
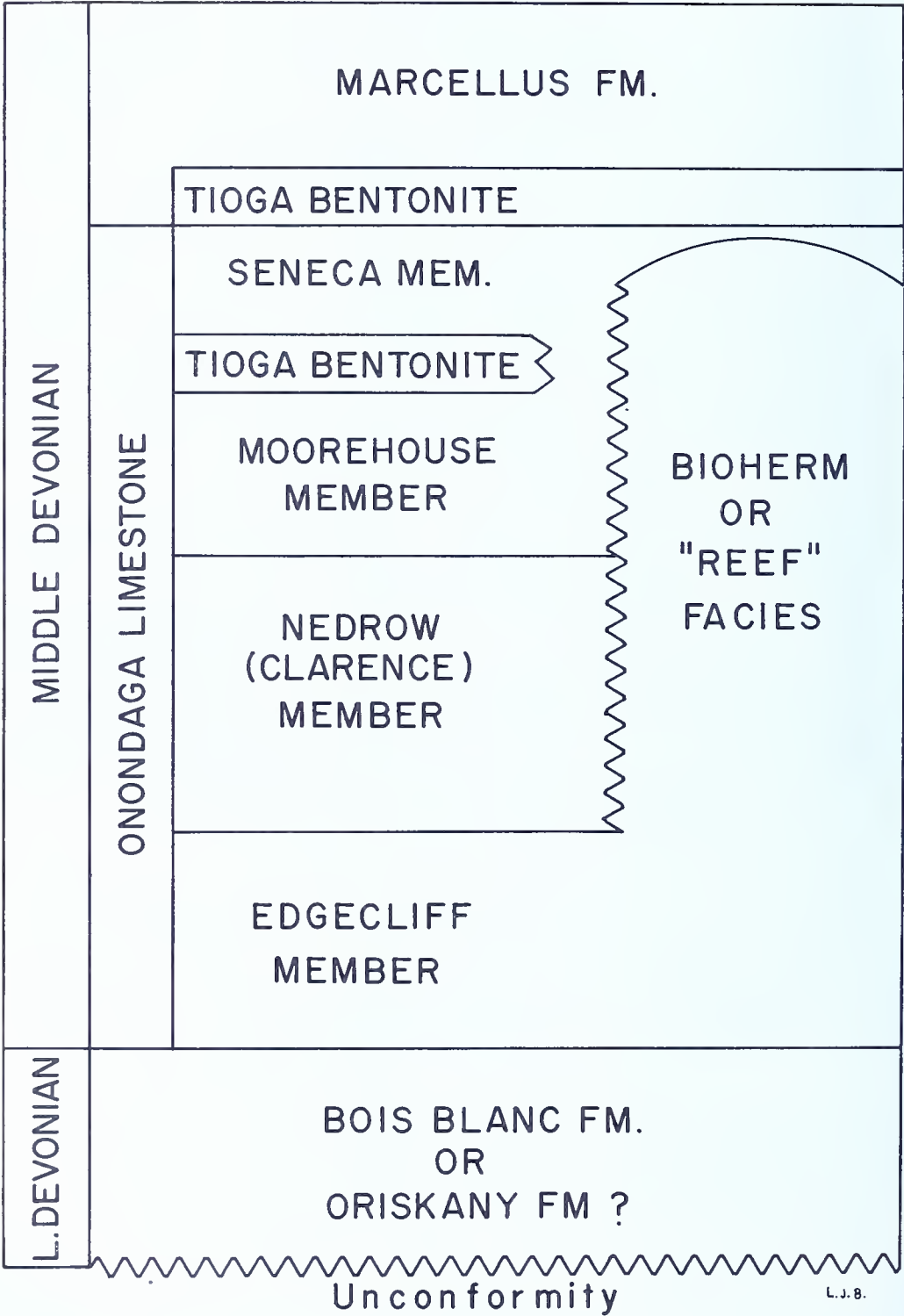


Figure 11. Gamma-ray, neutron, density log of the Discovery Well at Cyclone Pool indicating the stratigraphy, pay section, initial production, and treatment.



Modified from Crowley & Poore, 1974

Figure 12. Generalized stratigraphic section showing the members of the Onondaga Formation in McKean County, Pennsylvania.

reading. In well cuttings, it is generally a gray to light gray, clean, crystalline, cherty, grainstone. Bioherms or "reefs" develop in the Edgecliff member (Lindholm, 1967). Figure 13 illustrates the thickness of the Edgecliff member in McKean County. Note that bioherm or "reef" development occurs on a broad area of Edgecliff which is less than ten feet thick. This may define a platform area from which the Edgecliff is seen to thicken in both directions. This platform area corresponds to the northwest edge of the no sand area. This supports the idea of a paleo-high which received no sand deposition and very thin Edgecliff deposition. This area would be a high energy location and would be ideal for bioherm or "reef" development.

The Nedrow member of the Onondaga Formation is defined by a relatively high gamma-ray response. The overlying Moorehouse member has a lower gamma-ray response similar to the Edgecliff. The Seneca member is defined only where a Tioga bentonite bench is present within the Moorehouse. The Seneca and Moorehouse members have a similar log

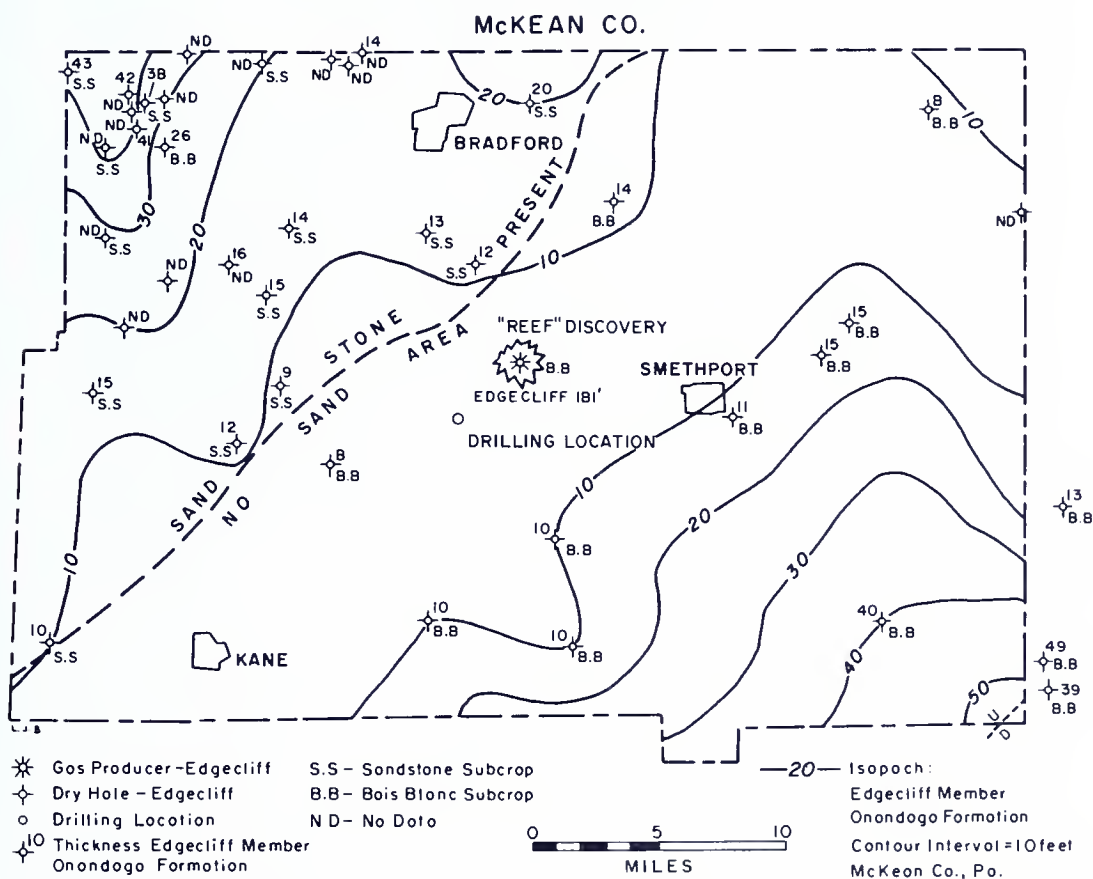


Figure 13. Isopach map of the Edgecliff member of the Onondaga Formation with the lithology of the underlying unit indicated, McKean County, Pennsylvania.

response. The Seneca, Moorehouse, and Nedrow members could not be differentiated from each other in well cuttings. This portion of the Onondaga is a dark gray, crystalline, argillaceous, fossiliferous, detrital micritic limestone interbedded with a light gray, crystalline, micro-grained detrital limestone. The thickness of the Seneca, Moorehouse, and Nedrow members is shown in Figure 14. Note that no Seneca-Moorehouse-Nedrow facies is present over the "reef" and that the facies thins from the northwest (platform) to the southeast (basin). These units seem to define a more restricted environment behind the shelf edge "reef" trend. Note that the apparent "reef" trend is sinuous and extends approximately northeast-southwest through McKean County (Figure 13, 14).

Fairman Drilling Company is currently drilling an Onondaga reef test located approximately 3.1 miles southwest of the Amoco-Witco discovery (Figures 10, 13, 14). Potential for additional Onondaga "reef" discoveries in McKean County is excellent. A possible trend is defined by a thin Edgecliff facies, which may define a platform, and the outer edge of the thick Seneca-Moorehouse-Nedrow facies which appears to define a more

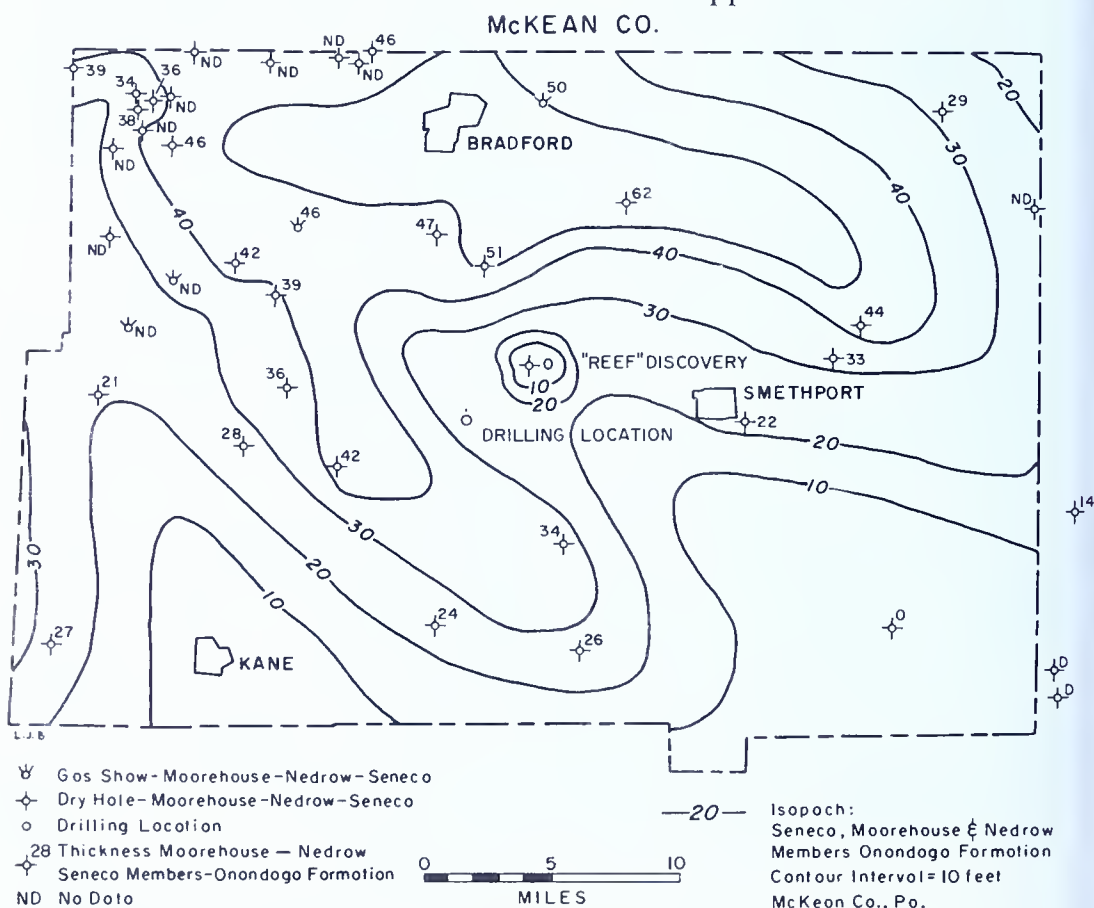


Figure 14. Isopach map of the Seneca, Moorehouse, Nedrow members of the Onondaga Formation, McKean County, Pennsylvania.

restricted, possibly lagoonal, environment. Future discoveries in McKean County and elsewhere along this trend are anticipated.

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PART IV. SUMMARIZED RECORDS OF DEEP WELLS REPORTED IN 1975

The information in the following tables has been compiled mainly from driller's logs and location plats received from the Oil and Gas Division of the Bureau of Land Protection and Reclamation. Other sources are Petroleum Information Corporation (PI), geophysical logs received by the Pennsylvania Geological Survey, and personal communications with oil and gas operators. The identification numbers in Table 13 refer only to well location numbers on Figure 4 of this report. The more significant numbers are the permit numbers by which the wells are filed with the Bureau of Land Protection and Reclamation and the unique quadrangle numbers by which the Survey files the wells and locates them on 15-minute quadrangle maps.

A single asterisk appearing on a log indicates that all formation tops and total depths were picked from a geophysical log. A log without an asterisk means that the formation tops and total depths are from the drillers' log or PI. Where a double asterisk appears, the 7½-minute quadrangle name and location are given. A plus sign appearing on a log indicates that all formation tops and total depths were picked from sample descriptions. These tables are listed alphabetically by county and by name of well. The elevations are ground (GR).

The producing depth record still stands at 11,458 feet in the Tuscarora (Lower Silurian) Sandstone, while the drilling depth record was established by the No. 1 Leonard Svetz by Amoco Production Company in Somerset County early in 1975 when the well was completed at a total depth of 21,460 feet in the Upper Cambrian.

Table 13. Summarized Record of Deep Wells Reported in 1975

MAP NUMBER		Armstrong 21672	Armstrong 21675	Armstrong 21684	Armstrong 21683	Armstrong 21710	Armstrong 21719	101	112	103	96
COUNTY	Permit Number	Veryl M. Clark #2	Harry L. Oando #1	William E. Geiger #1-14	Joseph H. Heilman #1	Raymond Lorant #1	Norman R. Martin #1 Unit-9	Edwin H. Tobias #1	O. W. & Annie Clark #1	Blair Gap Water Supply Co. #1	Cameron 20060
OPERATOR	Peoples Natural Gas #4938	J & J Enterprises	J & J Enterprises	J & J Enterprises	J & J Enterprises	J & J Enterprises	J & J Enterprises	Thomas F. Jennings #1	Columbia Gas Transmission Corp	Amoco Production Co.	PA Department Environmental Res. W-1383
TOWNSHIP	Parks	Kiskiminetas	Kiskiminetas	Kiskiminetas	Kiskiminetas	Kiskiminetas	Kiskiminetas	Darlington	W. Providence	Antis	Grove
QUADRANGLE	Freeport C 2	Elders Ridge O 48	Elders Ridge O 50	Elders Ridge O 49	Elders Ridge O 51	Elders Ridge O 52	Elders Ridge O 52	New Castle G 12	Clearville C 42	Altoona E 2	Oriftwood B 123
LATITUDE	29,700 ft. S 40°45'	22,700 ft. S 40°40'	17,300 ft. S 40°40'	18,400 ft. S 40°40'	29,500 ft. S 40°40'	2,600 ft. S 40°35'	3,800 ft. S 40°50'	21,250 ft. S 40°00'	21,250 ft. S 40°00'	5,000 ft. S 40°40'	4,175 ft. S 41°30'
LONGITUDE	6,050 ft. W 79°30'	11,850 ft. W 79°25'	9,200 ft. W 79°25'	13,750 ft. W 79°25'	17,200 ft. W 79°25'	19,450 ft. W 79°25'	21,900 ft. W 80°25'	21,050 ft. W 78°15'	21,050 ft. W 78°15'	9,200 ft. W 78°20'	2,900 ft. W 78°05'
DATE COMPLETED	12-14-74	1-3-75	2-1-75	1-20-75	3-27-75	4-10-75	6-1-75	8-10-75	8-10-75	9-24-74	7-16-75
ELEVATION	1192 GR	1538 KB	1401 KB	1312 KB	1186 KB	1335 KB	1225 GR	2360 GR	1353 GR	2360 GR	2184 GR
TULLY	5565-6700	*6770-6900	*6666-6797	*6580-6718	*6434-6563	*6635-6764		Purcell: 7020 Marcellus: 7100			
ONONDAGA	LIMESTONE	7051-7064	*7318-7340 Gas @7408	*7198-7217 Gas @7246	*7110-7149	*6970-7002 Gas @7068	*7170-7214 Gas @7267-7316	4524-4721		Marcellus and Neenore: 7130-7770	*6765-6776
	CHERT	7064-7197	*7340-7473	*7217-7347	*7149-7268	*7002-7140	*7214-7339				
ORISKANY	7197-7209 SG & SW in Cht-Or.	*7473-7496 Gas @7485	*7347-7369 Gas @7362	*7268-7292	*7140-7163 Gas @7149	*7339-7361 Gas @7345-46	4721-4760	7770-7824			*6776-6851
HELDERBERG	7209-	*7496-	*7369-	*7292-	*7163-	*7361-	4760	7824-8100			*6851-
KEYSER-BASS ISLAND								Tonoloway-8100 Willis Creek-9100			
SALINA											
GUELPH-LOCKPORT											
BLACK WATER											
CLINTON											
IRONDEQUOIT											
MEDINA											
WHIRLPOOL											
QUEENSTON											
TOTAL DEPTH	7331	7612	7469	7380	7255	7439	4930	7203	11,355		6925
DEEPEST FORMATION REACHED	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Marcellus	McKenzie	Helderberg
RESULT	Deeper Pool Test: Shallow Gas Prod. 102 Mcf AF 650 psi/4 days Vandergrift Field	1,000 Mcf AF 2,750 psi/48 hrs. Roaring Run Field	1,100 Mcf AF 2,875 psi/72 hrs. Roaring Run Field	1,100 Mcf AF 2,750 psi/48 hrs. Roaring Run Field	1,300 Mcf AF 2,750 psi/48 hrs. Roaring Run Field	1,200 Mcf AF 2,700 psi/48 hrs. Roaring Run Field	237 Mcf Nat. 650 psi/12 days Darlington Field SP Oil discovery Coalbank Run	N50G Abandoned New Field Wildcat	N50G Abandoned New Field Wildcat	N50G Abandoned New Pool Wildcat	N50G Abandoned New Pool Wildcat

SUMMARIZED RECORDS

[illegible]

Table 13. (Continued)

MAP NUMBER	88	89	90	91	92	93	94	95	96	97	98
COUNTY	Permit Number	Permit Number	Permit Number	Permit Number	Permit Number	Permit Number	Permit Number	Permit Number	Permit Number	Permit Number	Permit Number
NAME OF WELL	State Game Lands #28	J. B. & S. Hartman #1	J. B. & S. Hartman #1	J. B. & S. Hartman #2	J. B. & S. Hartman #3	North East Natural Gas Co.	Alfred & Leo Olzewski #1	Frank Pretka #3	Reichert-Horne Foy #1	James Sherman #1	Erie 20342
OPERATOR	Flint Oil & Gas, Inc.	Flanigan Brothers	Flanigan Brothers	Flanigan Brothers	Flanigan Brothers	Columbia Gas Transmission Corp.	North East Natural Gas Co.	Minnesota Oil & Gas Co.	Columbia Gas Transmission Corp.	J. Sterling McCluskey	Erie 20342
TOWNSHIP	Spring Creek	Springfield	Springfield	Springfield	Springfield	Amity	North East	North East	Franklin	Elk Creek	Elk Creek
QUADRANGLE	Hallton A-5	Girard I-447	Girard I-447	Girard E-448	Girard B-449	Union City C-9	North East C-35	North East H-123	Girard E-445	Girard F-439	Girard F-439
LATITUDE	21,900 ft. S 41°30'	9,200 ft. S 41°57'30"	10,650 ft. S 41°57'30"	2,300 ft. W 80°25'	9,120 ft. W 80°22'30"	17,000 ft. S 42°00'	17,200 ft. S 42°15'	20,850 ft. S 42°05'	5,700 ft. S 41°55'	7,600 ft. S 41°55'	7,600 ft. S 41°55'
LONGITUDE	5,450 ft. W 78°55'	850 ft. W 80°25'	2,300 ft. W 80°25'	2,300 ft. W 80°25'	9,120 ft. W 80°22'30"	20,850 ft. W 79°45'	18,450 ft. W 79°45'	18,350 ft. W 80°05'	3,825 ft. W 80°20'	10,000 ft. W 80°10'	9,200 ft. W 80°17'30"
DATE COMPLETED	8-31-75	12-15-74	12-22-74	12-22-74	1-12-75	10-30-75	12-6-74	12-18-73	10-3-74	8-6-74	10-24-73
ELEVATION	1760 GR	859 GR	851 GR	851 GR	856 GR	1307 K8	951 K8	1074 GR	1083 GR	1321 GR	1087 GR
TULLY	5330-5359	1875-2055	2050-2300	2050-2310	2090-2100 (horizon)	2090-2100 (horizon)	2100-2280	2100-2280	2100-2280	2100-2280	2100-2280
ONONDAGA	5735-5794	1875-2055	2050-2300	2050-2310	2090-2100 (horizon)	2090-2100 (horizon)	2100-2280	2100-2280	2100-2280	2100-2280	2100-2280
CHERT	5735-5794	1875-2055	2050-2300	2050-2310	2090-2100 (horizon)	2090-2100 (horizon)	2100-2280	2100-2280	2100-2280	2100-2280	2100-2280
ORISKANY	absent	2050-2300	2050-2300	2050-2310	2090-2100 (horizon)	2090-2100 (horizon)	2100-2280	2100-2280	2100-2280	2100-2280	2100-2280
HELDERBERG	5794-5864	2050-2300	2050-2300	2050-2310	2090-2100 (horizon)	2090-2100 (horizon)	2100-2280	2100-2280	2100-2280	2100-2280	2100-2280
KEYSER-BASS ISLAND	5864-5920	2050-2300	2050-2300	2050-2310	2090-2100 (horizon)	2090-2100 (horizon)	2100-2280	2100-2280	2100-2280	2100-2280	2100-2280
SALINA	5920-	2050-2300	2050-2300	2050-2310	2090-2100 (horizon)	2090-2100 (horizon)	2100-2280	2100-2280	2100-2280	2100-2280	2100-2280
GUELPH-LOCKPORT	5920-	2050-2300	2050-2300	2050-2310	2090-2100 (horizon)	2090-2100 (horizon)	2100-2280	2100-2280	2100-2280	2100-2280	2100-2280
BLACK WATER	5920-	2050-2300	2050-2300	2050-2310	2090-2100 (horizon)	2090-2100 (horizon)	2100-2280	2100-2280	2100-2280	2100-2280	2100-2280
CLINTON	2870-3050	2870-3050	2870-3050	2870-3050	2870-3050	2870-3050	2870-3050	2870-3050	2870-3050	2870-3050	2870-3050
IRONDEQUOIT	2960-2970	2960-2970	2960-2970	2960-2970	2960-2970	2960-2970	2960-2970	2960-2970	2960-2970	2960-2970	2960-2970
MEDINA	3050-3090	3050-3090	3050-3090	3050-3090	3050-3090	3050-3090	3050-3090	3050-3090	3050-3090	3050-3090	3050-3090
WHIRLPOOL	3150-3162	3150-3162	3150-3162	3150-3162	3150-3162	3150-3162	3150-3162	3150-3162	3150-3162	3150-3162	3150-3162
QUEENSTON	3162-	3162-	3162-	3162-	3162-	3162-	3162-	3162-	3162-	3162-	3162-
TOTAL DEPTH	6158	3192	3192	3173	3150	4032	2922	3338	3642	3883	3561
DEEPEST FORMATION REACHED	Salina	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Medina?
RESULT	SSG Abandoned Deeper Pool Wildcat Spring Creek Field	NSOG Abandoned Conneaut Field Bushnell-Lexington Pool	400 Mcf AF 950 psi/10 days Conneaut Field Bushnell-Lexington Pool	400 Mcf AF 950 psi/10 days Conneaut Field Bushnell-Lexington Pool	500 Mcf AF 1040 psi/10 days Conneaut Field Bushnell-Lexington Pool	94 Mcf Nat. 350 Mcf AF 919 psi/48 hrs. Wildcat Discovery Alder Run Field	787 Mcf AF 900 psi/48 hrs. Orchard Beach Pool	26 Mcf AF 810 psi/2 days Extension Weade Field Bliss Pool	2,000 Mcf AF 980 psi/23 hrs. Lundys Lane Pool	SSG Abandoned Lundys Lane Extension	SSG Abandoned Lundys Lane Extension

MAP NUMBER	81	86	110	111	Indiana 22969	Indiana 22888	Indiana 23014	Indiana 23094	100
COUNTY	Permit Number	86	Fayette 20152-P	Fayette 20153	Indiana 22813	Indiana 22888	Indiana 23014	Indiana 23094	Jefferson 21136
NAME OF WELL	Erle 20372	Erle 20372	Russell G. Estep #1	Francis R. Griffin #1	Clearfield Bit. Coal Corp. #4	Dallas E. Detwiler #1	Lawrence O. Good #1	Greensburg Catholic Diocese #1	Doverspike Brothers #1
OPERATOR	Minnesourt Oil & Gas Co.	Columbia Gas Transmission Corp.	Amoco Production Co.	Amoco Production Co.	Clearfield Bit. Coal Corp. #4	Felmont Oil Corp.	Felmont Oil Corp.	Felmont Oil Corp.	Doverspike Brothers, Inc.
TOWNSHIP	Elk Creek	Union	Saltlick	Nicholson	Pine	Pine	Pine	Pine	Ringgold
QUADRANGLE	Girard E-445 **Conneautville	Union City F-10	Donegal H-34	Masontown E-1	Barnesboro E-30	Barnesboro E-31	Barnesboro E-33	Barnesboro E-34	Smicksburg E-38
LATITUDE	4,800 ft. S 41°52'30"	16,500 ft. S 41°55'	22,500 ft. S 40°05'	30,000 ft. S 39°55'	17,100 ft. S 40°40'	26,750 ft. S 40°40'	20,900 ft. S 40°40'	24,400 ft. S 40°40'	10,900 ft. S 41°40'
LONGITUDE	2,850 ft. W 80°20'	6,150 ft. W 79°45'	5,200 ft. W 79°20'	3,050 ft. W 79°50'	22,250 ft. W 78°50'	9,610 ft. W 78°55'	17,800 ft. W 78°50'	20,900 ft. W 78°50'	22,100 ft. W 79°05'
DATE COMPLETED	9-18-74	10-28-75	1-27-75	3-10-75	1-26-75	3-31-75	7-3-75	9-8-75	5-1-75
ELEVATION	1092 GR	1580 X8	2213 GR	1207 GR	1729 X8	1817 X8	1961 X8	1729 X8	1537 X8
TULLY	2069-2104	*2806-2884	7216-7230 Marcellus: 8300-	7274- Marcellus: 7830-	*7217-7236	*7272-7287	7194-7210	*7220-7235	*6575-6684
ONONDAGA	2247-2499	*3050-3140 Boris Blanc	8470-8490 Huntersville: 8490-8630	7932-7950 Huntersville: 7950-8138	*7995-8010 Gas 88013-8126 *8010-8112	*7909-8004 Gas 87999-8098 *8004-8106	7931-7950 Gas 87983 & 8014 7950-8047	*8042-8058 Gas 88072 *8058-	*7092-7104 *7104-7204
ORISKANY	2499-2516	absent	8630-8850	8138-8238 Gas 88160-8238	*8112-8126?	*8184-	8047-8067		absent
HELDERBERG	2516	*3230-3238	8850-	8238-8468	*8126-	*8119-	8067-		*7204-7278
KEYSER-BASS ISLAND									
SALINA	2588-3080	*3238-3283 *3283-3864		8469-					*7278-
GUELPH-LOCKPORT	3080-3340	*3864-4128 SW 84030							
BLACK WATER									
CLINTON	3340-3456 Packer Shell:	*4128-4230 *4188-4200							
IRONDEQUOIT	3426-3456								
MEDINA	3456-3549	*4230-4352							
WHIRLPOOL	3629-3634	*4391-4404							
QUEENSTON	3634-	*4404-							
TOTAL DEPTH	3678	4525	8949	8700	8136	8132	8114	8072	7339
DEEPEST FORMATION REACHED	Queenston	Queenston	Helderberg	Keyser	Helderberg	Helderberg	Helderberg	Onondaga Chert	Keyser
RESULT	1,800 Mcf AF 950 psi/23 hrs. Gas 83491-93; 3501-46; 3578; 3630 Lundys Lane Extension	NSOG Abandoned Newfield Wildcat	NSOG Abandoned Newfield Wildcat	500 Mcf AF 1515 psi/96 hrs. Deerfoot Pool Wildcat Discovery Woodside Pool	1,500 Mcf AF 3975 psi/13 days Pinecon Field	23 Mcf Bat. 3100 Mcf AF 3672 psi/63 hrs. Pinecon Pool	396 Mcf Bat. 8,000 Mcf AF 4000 psi/48 hrs. Pinecon Pool	8,000 Mcf Bat. 4000 psi/48 hrs. Pinecon Pool	40 Mcf Bat. 375 Mcf AF 995 psi/72 hrs. OP4 Production in Timblin Field

Table 13. (Continued)

MAP NUMBER	93	94	95	106	105	107	109	108	
COUNTY	Mckean 31744	Mckean 33110-P	Mercer 20113	Potter 20478	Somerset 20049	Somerset 20051	Somerset 20043	Somerset 20045	Somerset 20042-R-P
NAME OF WELL	Minard Run Tract #2 Lot-50	Arthur F. Reeves #1	C. S. Osborne #5998	PA Game Comm. #1 L-4925	Thomas Benson #1	Pete & Bertha Gerula #1	R. J. Lambert #1	Leonard Svetz #1	Earl H. Weiner #1
OPERATOR	Minard Run Oil Co.	Pennzoil Co.	National Fuel Gas Supply Corp.	Columbia Gas Transmission Corp.	Amoco Production Co.	Amoco Production Co.	Amoco Production Co.	Amoco Production Co.	Peoples Natural Gas Co.
TOWNSHIP	Lafayette	Keating	Worth	Pleasant	Stony Creek	Paint	Stony Creek	Middle Creek	Milford
QUADRANGLE	Bradford E-11	Smithport G-5	Stoneboro I-16	Coudersport E-69	Windber G-6	Windber C-5	Windber G-4	Confluence 8-13	Meysersdale 8-6
LATITUDE	16,200 ft. S 41°55'	14,275 ft. S 41°50'	24,850 ft. S 41°20'	13,950 ft. S 41°55'	8,900 ft. S 40°05'	9,100 ft. S 40°15'	19,400 ft. S 40°05'	8,100 ft. S 40°00'	3,350 ft. S 40°00'
LONGITUDE	9,475 ft. W 78°35'	275 ft. W 78°25'	5,700 ft. W 80°00'	21,500 ft. W 78°05'	1,900 ft. W 78°55'	6,500 ft. W 78°45'	7,200 ft. W 78°55'	150 ft. W 79°20'	22,450 ft. W 79°05'
DATE COMPLETED	1-10-75	11-18-75	9-5-75	11-4-74	5-31-74	4-18-75	9-22-73	12-18-74	3-25-74
ELEVATION	2257 K8	1534 K8	1439 K8	2428 GR	2343 GR	2291 K8	2381 K8	2453 GR	2075 GR
TULLY	*4127-4798	*4178-4212	*3928-3984	*5048-5090	7550-7596	7730-7810	*7545-7585		*4408-4470
ONONDAGA	*5162-5212 Bois Blanc *5212-5228	*4694-4728 Bois Blanc? *4728-4730	*4134-4167 *4167-4264	*5574-5606	8522-8654	*8700-8722 *8722-8775	*8478-8504 *8504-8577	8300- -8500	9134- -9358
ORISKANY	absent	absent	absent	*5606-5614	8654-8788? Gas 88740-8770	*8775-8827	*8577-8620	8500-8540	Bois Blanc *4703-4753 *absent
HELDERBERG	*5228-5290	*4730-4795	*4264-4305	*5614-	878E-	*8827-9095	*8620- Gas 88636-8670	8540-9050	*4753-4803
KEYSER-BASS ISLAND	*5290-5338	*4795-4843	*4305-4435	*9095-			Tonoloway & Willis Creek 9050-10300		*4803-4938
SALINA	*5338-6200	*4843-	*4435-5132				McKenzie 10300-10950		*4938-5780
GUELPH-LOCKPORT BLACK WATER	*6200-6405		*5132-5380 Gas 5312, 5328, 5362						*5780-6062
CLINTON	*6405-6590		*5380-				Rochester & Rose Hill 10950-11400		*5933- *6062-6378 *6175-6378
MEDINA	*6515-6520						Tuscarora 11400-11900		*6378-6608 Gas 66550 *6598-6608
WHIRLPOOL	*6590-6740								
QUEENSTON	*6740-8162						Junata-Reedsville 11900-15860		*6608-
TOTAL DEPTH	10,478	4897	5443	5709	8840	9270	8740	21,460	OTO 9800 Redrill 9200
DEEPEST FORMATION REACHED	Cambrian	Salina	Rochester	Helderberg	Helderberg	Keyser	Helderberg	Gatesburg	Helderberg?
RESULT	Trent: 9120-10,010 Camb 1010-10400 Gas 10,010-10,230 Gas 500 psi Nat. 3000 psi/48 hrs. Opt. D. 6000-7000 Minard Run Pool	NSOG Deeper Pool Whitcat Smithport Field	353 Mcf Nat. 990 Mcf AF 1790 psi/24 hrs. Kilgore Pool	30 Mcf Nat. 30 psi/12 hrs. Deeper Pool Whitcat. Ended Shallow Product. Clara Hill Field	1,300 Mcf Nat. 3665 psi Extension Shanksville Field	NSOG Abandoned New Field Whitcat	2,500 Mcf Nat. 1,856 Mcf AF 2224 psi/48 hrs. Discovery Shanksville Field	Trent: 15860-17000 M. Ord: 17000-17450 L. Ord: 17450-20860 U. Camb: 20860 NSOG: D & A Deepest well in Appalachian Basin	NSOG Abandoned New Field Whitcat
									13 Mcf Nat. 350 Mcf AF 1600 psi/4 days Irwin Pool

SUMMARIZED RFCORDS

MAP NUMBER	92	104	104
COUNTY	Warren 24704	Westmoreland 20725	
NAME OF WELL	J. & S. H. Christensen #1	Louis Emanuel #1-4928	
OPERATOR	Columbia Gas Transmission Corp.	Peoples Natural Gas Co.	
TOWNSHIP	Columbus	Fairfield	
QUADRANGLE	Corry C-32	Somerset B-34	
LATITUDE	28,900 ft. S 42°00'	1,400 ft. S 40°15'	
LONGITUDE	14,500 ft. W 79°30'	1,600 ft. W 79°05'	
DATE COMPLETED	10-30-75	12-10-74	
ELEVATION	1536 KB	2859 XB	
TU-11	*2941-3032	*5775-5875 faulted 6765 *6810-6915	
ONUNDACA	*3220-3365		
ORISKANY	Bois Blanc *3365-3380 *absent		
HELDERBERG	*absent		
RENSSELAIR	*3380-3450		
SALINA	*3450-4095		
GULPH-LOCKPORT	*4095-4260		
BLACK WATER			
CLINTON	*4260-4380		
IRONDEQUOIT	*4352-4363		
MEQUINA	*4380-4572 Gas 04562 *4558-4572		
WHIRLPOOL			
QUEENSTON	*4572-		
TOTAL DEPTH	4654	8005	
DEEPEST STRATIFICATION RECORDED	Queenston	Marcellus	
REMARKS	1257 psi/48 hrs. New Field Wildcat Discovery Whites Run Field	MS05 Abandoned Beck Pool Extension	

